AGRICULTURAL CHEMICALS

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Pesticide-Wildlife Confusion

Instant Warehousing

Posticide Situation

Managing For Profit

Development of Specifications

SW Fertilizer Conference

Sales Development

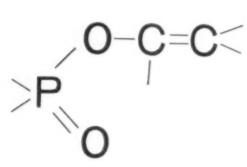
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1961-1962 BUYER'S GUIDE



This Month's Cover

A special feature of this month's issue of "Agricultural Chemicals" is the 1961-62 edition of the annual pure's Guide. It starts on page 71.

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Vol. 16, No. 9

September, 1961

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THE PESTICIDE SITUATION FOR 1960-'61	
MANAGING FOR PROFIT	****************
DEVELOPING PESTICIDE SPECIFICATIONS	*************
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MEETING CALENDAR

- Sep. 3-8 140th National Meeting. American Chemical Society, and National Chemical Exposition. Chicago.
- Sept. 7-9 Special Symposium on Herbicides and Their Use in Forestry, Oregon State University, Corvallis.
- Sept. 18-20—Canadian Agricultural Chemicals Assn., 9th Annual Meeting, Mont Tremblant Lodge, Mont Tremblant, Quebec.
- Sept. 24-27 American Institute of Chemical Engineers, Lake Placid Club, Lake Placid, N. Y.
- Oct. 2-8-National Hardware Show, McCormick Place, Chicago.
- Oct. 4-6 Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.
- Oct. 9-10 Four-State Applicators & Chemical Conference, Chinook Motel and Tower, Yakima, Wash.
- Oct. 9-11—Western Agricultural Chemicals Association. Annual Meeting, Hotel Claremont, Berkeley, Calif.
- Oct. 12-13—Northeastern Fertilizer Conference, Schine Inn. Chicopee, Mass.

- Oct. 16-18 Entomological Society of Canada, Entomological Society of Quebec, Joint Meeting, Quebec, P.Q., Canada.
- Oct. 16-20—Fertilizer Sessions, National Safety Congress, Pick-Congress Hotel, Chicago.
- Oct. 20-22 Eastern Lawn, Garden, and Allied Products Trade Show, Coliseum, New York.
- Oct. 25-26 Association of American Fertilizer Control Officials, Woodner Hotel, Washington, D.C.
- Oct. 30-31 Eastern Branch, ESA, Lord Baltimore Hotel, Baltimore, Md.
- Oct. 29-Nov. 1 National Agricultural Chemicals Association, 28th Annual Meeting, The Homestead. Hot Springs, Va.
- Oct. 30-Nov. 1—National Fertilizer Solutions Association. Annual Convention, Edgewater Beach Hotel, Chicago.
- Nov. 2-3 Pacific Northwest Plant Food Association, annual convention, Hotel Gearhart, Gearhart, Oregon.
- Nov. 6-7 Annual Weed Conference. Washington State Weed Association. Chinook Motel and Tower, Yakima, Wash.

- Nov. 7-10 British Insecticide & Fungicide Conference. Brighton. England. Sponsored by Association of British Manufacturers of Agricultural Chemicals.
- Nov. 8-10—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.
- Nov. 12-14 38th Annual Convention of California Fertilizer Association, Jack Tar Hotel, San Francisco.
- Nov. 21-24 Mexican Assn. of Insecticides & Fertilizers Manufacturers, La Paz, Lower California, Mexico.
- Nov. 27-30—Entomological Society of America. 9th Annual Meeting. McAllister Hotel, Miami, Florida.
- Nov. 27-30 American Society of Agronomy (Soil Science and Crop Science Societies included). Sheraton-Jefferson Hotel, St. Louis, Mo.
- Dec. 5-7—National Aviation Trades Association, Annual Meeting, Washington, D. C.
- Jan. 18-19 Arizona Aerial Applicators Assn., Safari Hotel, Scottsdale, Ariz.
- Jan. 25-27 California Aerial Applicators Assn., Hotel El Mirador, Palm Springs, Calif.



Fertilizers and Fertilizer Raw Materials

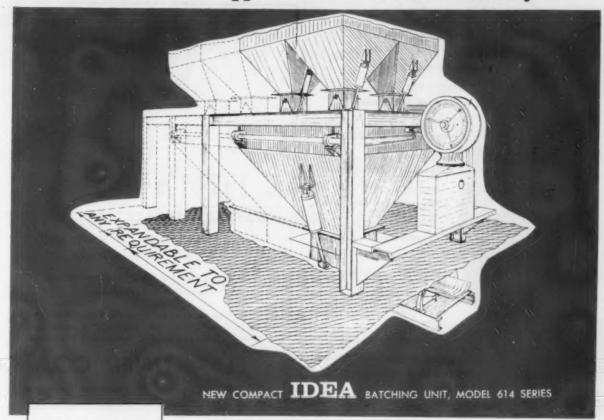
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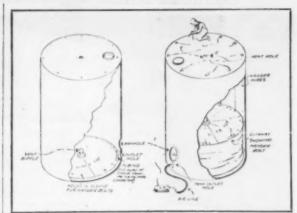


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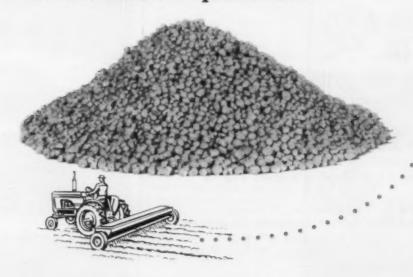
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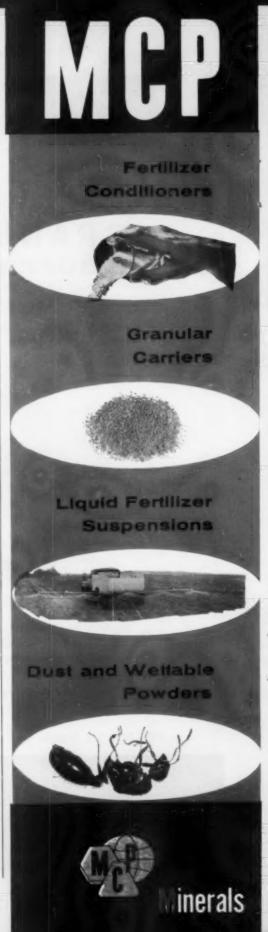
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- Pesticides and Wildlife . . . The results of a survey conducted by Southern Illinois University indicate that little organized research is underway, except by the large chemical companies, that will clarify the pesticide-wildlife picture. Page 14.
- 'Instant Warehousing . . . The use of air supported structures by the U. S. Armed Forces under a wide variety of conditions indicates that such structures could be used by industry to provide temporary warehousing for seasonal products such as fertilizer. Page 17.
- Pesticide Situation . . . The annual report of the Agricultural Stabilization and Conservation Service's Agricultural Chemicals Staff reveals that DDT production is continuing to increase, as is the total volume of pesticidal chemicals produced in the U.S. Page 19.
- Management Seminar , . . The problems involved in successfully operating typical fertilizer production plants are covered in detail during a three-day seminar conducted by a large supplier. Page 23.
- c Pesticide Specifications . . . Most specifications in use for pesticides today are based on specifications issued by the federal government. A USDA official traces the development of pesticide specifications. Page 28.
- Sales Development Program . . . A sales development program recently instituted by a major producer is credited with a 5 to 7 per cent overall increase in sales during 1960. Page 39.
- Orchard Tours . . . Many promising new chemicals are being tested for control of orchard pests, but growers are advised that few of them will be available for use next year. Page 45.



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EDITORIALS

It is, of course, proper that there should be regulations governing the use of pesticides, but it is somewhat ironic that the hazards and risks of pesticides are lessening, as research uncovers new compounds that are effective in pest control yet harmless to man and his animals, while regulations become stricter. It can safely be said that the majority of new regulations being considered by state legislatures has been inspired by special interest groups who, if allowed to prevail without opposition, might influence legislation that could revert this country back to the horse and buggy days almost overnight.

Oregon's pesticide bill to tax 2,4-D is an example of a very unfair type of legislation. If followed in other states, it could seriously curtail pesticide use by pricing the products right out of the market. This bill was passed at the insistence of a minority who, apparently, are trying to find funds to finance research which should be financed by all of agriculture and not just by 2,4-D users. Also, the bill has a provision for diverting some of the fees collected to the 2,4-D control areas established under another law. This would, in effect, reduce the amount of contributions that persons in these protected areas have to pay to keep themselves "protected."

Indiana enacted a herbicide registration law which, as introduced, would have imposed a tax on all herbicides. As finally adopted, it provides for manufacturers' licenses, plus extremely high registration fees. The bill was enacted upon the insistence of a small segment of the canning industry who claim that excess damage to tomatoes has resulted from drift of 2,4-D. However, their approach to solving this problem is to ban 2,4-D from the state and charge a tonnage tax on other herbicides to help enforce the ban. At no time in the deliberations on this bill did

any of the so-called injured parties offer to help finance control measures to protect their tomatoes.

That the many state pesticide regulation bills are not being allowed to pass unnoticed is evidenced by the overall legislative box score this year which has not been too bad. Most of the credit for this must go to the state legislative service of the National Agricultural Chemicals Association. This, however, is a defensive type of program. A more positive type of approach would be to dispel any fears of both those who use insecticides and those who consume the treated crops. The public must be assured that a poisonous insecticide can be used without hazard to the consumer and can be used to his ultimate benefit. The collection of properly authenticated data is not easy, however, while, on the other hand, the collection of sensational reports concerning pesticide damage to humans and/or wildlife is very easy and always seems to find a vehicle for publication.

THE next big wave of expansion in the fertilizer industry may well, it now seems probable, occur in the market overseas. America's domestic fertilizer industry has of course been expanding at a rapid rate for the past twenty years, and new plant construction continues steadily to increase the capacity of the industry; but even greater strides are currently being made in establishing new fertilizer manufacturing facilities in dozens of other countries round the world. We could fill many pages in this magazine every month if we gave space to all the accounts of new plants being built in foreign countries.

The major firms that build fertilizer plants and supply equipment for them are thoroughly

(Continued on Page 150)

Lack of Authoritative Data Clouds Pesticide-Wildlife Picture

Most of the figures available today on the effects of insecticides on mammals result from studies and observations made following treatment of extensive areas by the United States Forest Service and the Department of Agriculture. There are no statistics that reflect the effects of the everyday utilization of chemical controls by individual farmers, or small applications by various states. Yet, only three per cent of insecticides used are by governmental agencies.

by W. D. Klimstra

Cooperative Wildlife Research Laboratory Southern Illinois University, Carbondale, Illinois

"The data utilized for the preparation of this paper resulted from a survey of the literature, correspondence with various researchers, and questionnaires and letters sent to all State Departments of Agriculture and Conservation, 248 manufacturers and distributors of agricultural chemicals, and all Cooperative Wildlife Research Units in the eastern United States. This assignment provided an opportunity for contrasting views of several categories of persons: industrialists, agriculturalists, economic entomologists and conservationists. It thoroughly exhausted my facilities to unravel truth from fiction, bias from unbias, and knowledge from ignorance. In fact, what is presented may suggest that this was not accomplished." W. D. K.

THE most obvious fact learned from this study was the absence of data that would reveal the current status of the question at hand. The literature showed that organized studies, which would yield universely.

biased data, were scarce. Much of the written material reflected surveys created in an atmosphere of panacea, and which were hurriedly conducted, frequently using mostunscientific methods. Most revealing, however, was the indifferent attitude of most states; exceptions were those where crises had arisen. But even here, once a crisis had passed, the interest waned. In states where there were bitter conflicts of interests as a result of the wide use of chlorinated hydrocarbons, there was little evidence that conservation agencies were stimulated sufficiently to develop a program of offense.

Correspondence and questionnaires suggested that little organized research is underway, except by the large chemical companies. Virtually no research seems anticipated which will reflect the effects of the various agricultural chemicals on wild populations of mammals. Chemical companies are concerned with effects on laboratory species, while most other research agencies are restricted to confined animals; largely birds. The questionnaires suggest that there was, and is, little concern about mam-

There appears to be little hazard to wild mammals from present-day use of most herbicides (Springer 1957, Rowe and Hymas 1954); only a few dangerous materials are in use. The dinitro compounds and sodium arsenite are examples of the latter (Rudd 1954, Rowe 1952, Boyce and Verme 1954, Springer 1957). No known cases of active herbicidal poisoning from field applications of herbicides marketed as non-poisonous have been reported. The greatest concern of biologists and conservationists should be the effect of vegetational manipulation on wild populations of mammals. It is apparent, however, that only in rare cases do researchers evaluate mammalian

This Article is from a paper read at the 41st Annual Meeting of the American Society of Mammalogiats, June 12-16, 1961, Urbana, Illinois, Symposium on Pesticides and Herbi-

populations other than the specific forms for which an attempt is being made to improve the habitat.

Most of the data available on the effects of insecticides on mammals result from studies and observations following treatment of extensive areas by the United States Forest Service and Department of Agriculture. No data were found which reflected the effects of the everyday utilization of chemical controls by individual farmers, or small applications by various states. Yet, it is reported that only 3% of insecticides used are by governmental agencies.

Of the present day insecticides, the chlorinated hydrocarbons have the greatest potential for harm to warmblooded vertebrates; mammals usually show a greater resistance to poisoning by these newer insecticides than other vertebrates. However, Scott, Willis, and Ellis (1959), in an analysis of the effects on wildlife of a field application of dieldrin at the rate of 3 lbs. of active ingredient per acre, reported heavy mortality. Ground squirrels, muskrats, and rabbits were virtually eliminated, and there was heavy loss among short-tailed shrews, fox squirrels, woodchucks, and meadow mice. White-footed mice showed a relatively high resistance. Reports from southern United States, following the use of dieldrin and heptachlor in an ill-advised program of fire ant control, indicated heavy mortality among most domestic and wild mammals (Allen 1958, Lay 1958, Peters 1958, DeWitt and George 1960). The general concensus of opinion is that most mammals can tolerate 4 to 5 lbs. per acre of DDT with little or no apparent immediate effect (Rudd and Genelly 1956, DeWitt and George 1960). In some cases, a reduced food supply may become apparent (Goodrum et.al. 1940, Couch 1946).

As a result of contact with chemical producers and distributors, and applicators of pesticides, it was obvious that cooperation between agencies concerned with licensing, application, supervision,

and advisement is variable in different states. In most, it is nonexistent and in a few, it appears good. The general absence of coordination of activities of all agencies concerned with the use of pesticides is real, despite the biased arguments of state and federal entomologists and agriculturalists. The logical responsibilities would seem to include advance publicity on (a) programs of control to be instigated, (b) expected results in terms of losses to non-target species, (c) possible long term effects, and (d) precautions to be exercised by humans and domestic animals. In this respect, the analysis of the question concerned with cooperation on the returned questionnaires revealed some interesting facts. Less than 50% of the state departments of conservation report cooperation with state and federal agricultural departments, whereas, almost 90% of the state departments of agriculture say they cooperate with both the U.S. Government and their own state departments of conservation. Yet, only 26% of the state departments of agriculture indicate that applications actually are supervised by their respective conservation departments. In respect to educational programs or notifications prior to application of insecticides, 72% of the state departments of conservation indicate there are none, whereas 78% of the state departments of agriculture report that all applications are preceded by such programs. It is of interest to note, too, that most state departments of conservation indicate that applications are unsuccessful, whereas, 84% of the state departments of

agriculture say that they are successful. As might be expected, 96% of the state departments of conservation feel federal regulations are too lax, whereas 64% of the state departments of agriculture and 82% of the chemical companies feel that these are adequate. I am inclined to agree with the latter, provided there could be uniformity, clarification, and mutual collaboration among the private, state, and federal agencies responsible for regulations and their enforcement.

Little will be gained by continuing to emphasize the fabricated publicity, when there is publicity, regarding the learned applicators' story that the chlorinated hydrocarbons will do no harm to anything but the target species. However, it is apparent that applicators (agriculturalists and entomologists) are not fully in command of most of their programs. This was evident in the fire ant control program when it was found that desired results could be obtained with applications of 75% to 150% less than had been employed during the initial control program. Such suggests that the use of pesticides still is in the experimental stage; yet, applicators have no qualms about using pesticides as though they were tried, tested, and proven without reason of doubt. Evidenced, then, is an irresponsibility which should and must not be tolerated, but which apparently is condoned by some federal and state agricultural agencies. Although signs of moderation, honesty, and mellowed attitudes are becoming apparent among field experts in their use,.

Less than 50 per cent of the state departments of conservation report cooperation with state and federal agricultural departments, whereas, almost 90 per cent of the state departments of agriculture say they cooperate with both the U. S. government and their own state conservation departments. Insecticides or herbicides should not be viewed, with respect to responsibility for misuse, any differently than what present attitudes hold for long-standing poisons or guns. The responsibility is on the applicator of the chemicals, no one else.

or recommendations for use of pesticides, the potential damage to wild animals and man is not eliminated. In fact, it may not be lessened as so little is known about many aspects of residue, infiltration, decomposition, accumulation, or secondary toxicities.

Attitudes of many manufacturers, agriculturalists, entomologists, and even biologists, reflect prejudice and misunderstanding. Too frequently the use of pesticides is rationalized only on the basis of economics, food production, or unfounded evidence of human welfare. It appears to be heresy to consider esthetic, economic, and human values that are not directly associated with food production or disease.

In most cases, "blanket mortality" frequently created by an insecticide is ignored. The effects of chemical controls on the organization of nature appear unimportant. There is little evidence of an appreciation of the biological consequences resulting from man's uninhibited use of his environment. Ignoring or belittling the effects of pesticides on low forms of life leads to a gradual disrespect for man himself. In this day of population increment maybe this can be justified. If so, there should be no concern about cancer, heart disease, leukemia, multiple sclerosis,

Concerning the harmful effects of herbicides and insecticides on mammals, only 21% of the states indicate that there is frequent loss; the remainder indicate none, or only occasional. It is of interest to note that 70% of the state conservation departments say that affected mammals are report-

ed by farmers, land owners, or laymen, suggesting that trained personnel are rarely involved. Less than 35% of these departments indicate that they are undertaking or promoting a research program concerning effects on mammals. Among the chemical companies, 60% report that tests are made on small mammals and 40% of them indicate tests on large mammals; of these, 30% are analytical and 70% toxicological. Only 19% indicate tests which will reflect effects on reproduction, 43% on physiological condition, and 50% on LD rate; 29% analyze nerve tissue, 36% body fat, 36% muscle tissue, and 34% blood.

It was noted that 62% of the chemical companies are of the opinion that the largest share of responsibility for a pesticide program rests on the shoulders of the chemical industry. Most of them, however, believe that applicators, state and federal agencies, and the general public share in this responsibility. The answer to the problem does not appear in unlimited controls on manufacturers, except with respect to complete and appropriate labels and the necessary research to establish all aspects of toxicity. Most, if not all, regulations should be exercised on agencies which promote and recommend the use of insecticides, i.e. private individuals, eradicator companies, the United States Department of Agriculture, and state departments of agriculture.

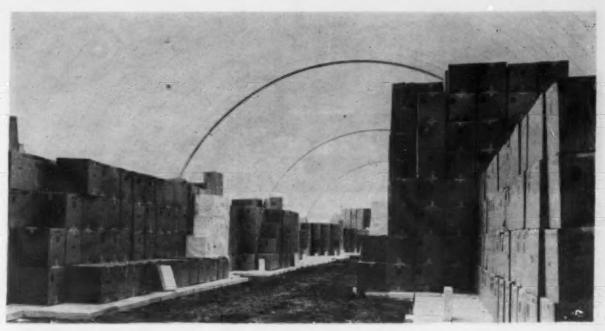
Most assuredly, the manufacturer has a responsibility, but how far does this go? Do we condemn the manufacturing of guns because every day one person shoots another? There are laws of registration and licensing, but we do not hold manufacturers responsible for accident or murder resulting. True, that in some states there is a Dram Shop Act that says the seller is responsible, but this does not place responsibility on the brewery or distillery. Insecticides or herbicides should not be viewed, with respect to responsibility, any differently than what present attitudes hold for long standing poisons, guns etc. The responsibility is on the applicator, no one else.

The pesticide program is extremely costly; it is truly a big business venture, as $1\frac{1}{2}$ to 2 millions are required frequently to put a single product on the market. Many are short-lived; hence, only big companies can survive. Some of the smaller companies, that operate on a shoestring and in desperation, may find trouble in meeting their specific responsibilities. These are a very small minority and the entire agricultural chemical industry should not be condemned.

Conservation departments and the U.S. Fish and Wildlife Service are charged with the responsibility for protection of wildlife. Misconduct on the part of the public supposedly is not tolerated and results in reprimands related to the seriousness of the offense. A deliberate pollution of a stream may result in a fine and/or replacement of animal life lost. Why are the state departments of agriculture, the United States Department of Agriculture, commercial eradicators, and private citizens immune in respect to misuse of agricultural chemicals which result in wildlife mortality?

Ecologists, mammaiogists, and biologists have dirty linen too. Herbicides and rodenticides commonly are used in the control of plants and animals, many times to improve the environment for game species. How many of such programs include an evaluation of effects on non-target species or habitat changes and, hence, food

(Continued on Page 143)



Just Add Air

Instant Warehousing Now Available To Industry

A new development in construction promises to provide low cost warehousing that can be easily erected by a fertilizer dealer or manufacturer in any open space. More like balloons than buildings, the warehouses are made of high strength nylon fabric. Air alone holds them up.

is ready to put it on his fields.

Most dealers furthermore, do not have warehouse space available to handle all the fertilizers they will sell during the peak periods. It remains, therefore, for the formulator to provide most of the inventory for the industry since he must,

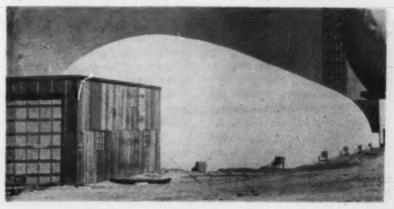
The airlock in foreground can take highway trailer loads of material into storin most cases, produce fertilizers on a year-around basis in order to supply the demand in the spring and fall.

Since most fertilizer materials are sold at discount prices during off-seasons, the formulator or dealer who could take advantage

age for this air-supported structure at a U. S. Army Nike-Zeus center.

THE problem of storage of both raw materials and finished products has always been of great concern to industry. It is especially so these days in the fertilizer industry because of the decreasing profit margins under which most manufacturers are forced to operate, and because of the seasonal nature of fertilizer shipments.

The farmer, of course, has no need for fertilizer until he actually









A complete 30-foot by 60-foot building is shown being erected. The building arrived at the scene in the station wagon at the left. It is being laid out

of seasonal discounts by buying all his materials during those periods would, it appears, be operating at an advantage during peak periods when prices are higher. The drawback, of course, is that the cost for warehousing the large quantities of raw materials often is greater than any savings realized by the purchases at discount prices.

Now, however, a new development in construction promises to provide low cost warehousing that can be easily erected by a dealer in any open space. Air-supported structures, first used by the Armed Services as inexpensive and easy-toerect shelters for radar stations and missile bases, now are available for any number of uses. More like balloons than buildings, the shelters are made of high strength nylon fabric covered with weather-resistant vinyl. Air alone holds them up. There is no framework, and no columns, beams, or trusses are required. The structures are inflated and held erect by a remarkably slight air pressure pumped in by a small blower. The coated nylon fabric is air-, water-, and fireproof. It resists scuffing, ripping, sunlight, weathering, oils, mildew, and most acids.

At a very small fraction of the cost of a "permanent" building, therefore, the balloon-type structure can provide up to 500,000 cubic feet of unobstructed warehouse space. Among other advantages cited by Airshelters Inc., Akron, Ohio, one of the manufac-

on the ground in the first picture, inflated in the second, and ready-for-use in the third. The whole job was done by three men in less than an hour. This

turers of such structures, are that the shelters do not need painting. They require no artificial lighting in daylight hours, and they need not be heated when not in use. A 2 hp. blower keeps even a large shelter erect.

What makes such structures especially attractive to fertilizer mixers is that they provide low-cost temporary storage space whenever needed. When inventories return to normal, the envelope can be deflated and stored in a surprisingly small space. It can be transported from place to place in a station wagon, for instance.

The shelters can be heated, cooled, or humidity-controlled to meet essential requirements of the product in storage. Air locks, with large electrically operated doors, can be used to admit trucks, fork-lifts, or personnel without disturbing the slightly more than one pound per square foot supporting pressure.

The standard shape of an air structure is a partial sphere, or a partial sphere separated by a center section. Any number of these center sections may be added or subtracted as needed to offer practically limitless size possibilities. A football field can fit easily into some shelters currently in use as warehouses.

The fabric for the air supported structures offered by Airshelters Inc. is woven of a heavy cord of 840 Denier nylon. It weighs 5.5 ounces per square yard

warehouse is secured by weights in its base, larger structures, however, require permanent foundations to which the air structure can be boilted.

and has a tensile strength of approximately 350 pounds per inch of width. A coating of vinyl plastic protects the fabric from the sun, wind, rain, and other outside influences.

Life estimates for such structures naturally are dependent upon the amount and type of use, and upon the amount of sunlight in each geographical area. Best estimates are that negligible loss of strength occurs in the first three years, with some slight acceleration to a period of five years. Beyond that time, deterioration is more rapid, and retained strength may reach minimum design requirements by a seven to ten-year period.

At its base, an air supported structure is the opposite of any other building concept. Instead of footings to support weight, the air structure needs a base to resist a lifting force. It is literally a parachute being held to the ground. It can be held by cables or ground anchors. Where mobility is not required, a concrete base can be prepared to which the air structure can be bolted.

A standard air supported structure is built in sections to keep down weight and bulk, and is easily assembled. Once assembled, it can be put up or taken down in less than an hour.

Little or no maintenance is required. The fabric is resistant to puncture or accidental damage,

(Continued on Page 144)

Production Of DDT Continues To Increase

In 1960, for the third successive year, U. S. production of DDT was higher than ever before. Both 2,4-D and 2,4,5-T were manufactured in larger quantities than in any previous year. Several other major pesticidal chemicals were in larger production than in 1959. Total volume of synthetic organic pesticidal chemicals produced rose 9.2 per cent in 1960 over 1959. Dollar value rose 7.6 per cent.

S. production of DDT last year amounted to 163,582,000 pounds, making 1960 the third successive year that DDT production had been higher than the previous year, according to the report of the Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture, on the pesticide situation for 1960-1961. The report was prepared by the service's Agricultural Chemicals Staff under the direction of Harold H. Shepard.

Production of DDT for the first four months of 1961 was 58,-895,000 pounds. In March, it was the highest on record, 16,048,000 pounds, indicating a possible annual U. S. capacity of nearly 190 million pounds. Exports of DDT last year amounted to 98,964,000 pounds, of which 86,530,000 pounds were in the form of 75 per cent wettable. During the first three months of 1961, DDT exports were 37,599,000 pounds, of which 35,297,000 pounds were 75 per cent material.

Combined production of aldrin, chlordane, dieldrin, endrin, heptachlor and toxaphene changed little from a year ago. Inventories remained about the same, and exports by the primary producers differed little from the quantity shipped in 1959. Of "polychlor" exports in 1960, Egypt received 17 per cent (or 8,277,000 pounds); in February and March, 1961, however, the United States shipped 12, 106,000 pounds of these materials to Egypt out of a total of 16,889,000 pounds for the two-month period.

Parathion production dropped from the 1959 level of 9,180,000 pounds to 7,448,000 pounds in 1960, while production of methyl parathion rose from 5,987,000 pounds to 11,794,000 pounds. Inventories of phosphorus insecticides in the hands of the primary producers of these materials on September 30, 1960 were 23 per cent methyl parathion, 13 per cent parathion, and 64 per cent other phosphorus compounds.

Lead arsenate production has not varied much in the last six years, averaging 13,000,000 pounds a year. Production of calcium arsenate in the same period jumped from 3,770,000 pounds in 1955 to 27,000,000 pounds the following year because of the resistant boll weevil situation. Since then, production has gradually fallen to under 5,000,000 pounds in 1960, as usage for weevil control has lessened. Manufacturers' stocks dropped by the end of the 1960 season to one-half those at the end of the previous crop year.

Notwithstanding the disturbed political condition in

central African countries, U. S. imports of pyrethrum flowers and extract were both at somewhat higher levels than the previous year. Their combined value amounted to \$5,877,838, compared to \$5,295,467 in 1959.

General Situation

Low temperatures for long periods during the spring of 1961 slowed the sale and use of insecticides. This situation, however, tended to be reversed in the summer with arrival of hot and moist weather. Increased use of herbicides last year, owing to product improvement and rising cost of manual weed control, was expected to continue this year. Occasional shortages of some pesticides, mostly temporary, were reported in 1960. Wet weather was general in 1960, favoring the growth of weeds and the development of fungus diseases. As a consequence, the use of fungicides and herbicides rose over 1959, while insecticide sales were somewhat lower. In 1960, both 2,4-D and 2,4,5-T were manufactured in larger quantities than in any previous year. Several other major pesticidal chemicals also were in larger production than in 1959 (see table). Total volume of synthetic organic pesticidal chemicals produced rose 9.2 per cent and dollar value rose 7.6 per cent in 1960 over 1959.

For the three years 1959-1960, fungicides comprised 22.7 per cent of total production of synthetic organic pesticides, herbicides 26.4 per cent, and insecticides 50.9 per cent.

U. J. production of some major posticidal chemicals by calendar years, 1950-1960.

Chamical	1958	1959	1960'
	1,000 lb.	1,000 1Ь.	1,000 1ь.
Aldrin loxaphene group 3	98,280	86,868	90,671
Senzene hexachieride (gross)	30,797	27,574	37,444
Boncono hexachioride (ocumna			
equivalent)	6,500	5,500	6,900
Calcius amenate	10,432	6,424	
Copper paphthonate	1,853	1,887	1,893
Copper sullate	97,192	80,584	116,000
(45) year	30,944	29,282	36,185
	21,938	24,672)	
(A-D) acres solts 4	2.964	2,749)	34,031
	145,328	156,741	163,582
		. 8	2,434
	14,938	12,904	5
Saltovi promide	10,224	11,193	11,264
Methy Parathion	5,018	5,987	11,794
	Section 1	3,350	2,978
	5.439	9,180	7,448
Total Constituted	35.177	38,814	39,336
Sheur, ner une acetate	1.056	943	- 8
Postury enloyates	134,496	176,600 8	182,368
ALT AND DESCRIPTION OF THE PARTY OF THE PART	3,678	5,547	6,337
U.ST acid ester and selts	5.230	8.033	7,924
Drain	1,178	757	982

ion; U. S. Burens of the Cemus;

The value of U.S. exports of pesticides in 1960 rose to \$105,-981,000 from the \$85,921,000 shipped in 1959. This is a larger increase than had taken place during the previous four years. Copper sulfate, 2,4-D, 75 per cent DDT, fungicides, and disinfectants accounted for a large share of the \$20,000,000 increase over 1959.

Agricultural pesticides purchased in connection with operations of the International Cooperation Administration are supplied mainly from the United States. The total value supplied in 1959 was \$14,220,000, the U.S. proportion being 96 per cent; in 1960 it was \$6,864,000, with the U.S. supplying 86 per cent.

Extremely large supplies of U. S. pesticides were exported to Cuba before shipments were virtually stopped late in 1960. In the four-month period July through October, the value of these exports amounted to \$2,918,372 compared to \$1,791,534 for the first six months of the year. Only \$10,701

worth went to Cuba in November and December, and none in the first quarter of 1961. The total for the year 1959 was about \$2,242,000.

Stocks of primary pesticidal chemicals in the possession of their producers on September 30, 1960 rose appreciably over the same date in 1959, according to the annual inventory survey conducted by the U. S. Department of Agriculture in cooperation with the National Agricultural Chemicals Association. DDT, organic phosphorus compounds, and miscellaneous herbicides were in large part responsible for the increase. Primary stocks of benzene hexachloride were considerably higher without a corresponding rise in total gamma equivalent. Inventories of calcium arsenate, lead arsenate, and 2.4.5-T were down from the previous year. Total carryover of technical and formulated pesticides by primary producers and formulators in 1960 increased 13 per cent over 1959, judging by paired reports which

accounted for 94 per cent of all materials reported in the 1960 survey. Concentrates and ready-to-use mixtures comprised 36 per cent and technical (undiluted) chemicals 64 per cent of total carryover.

The value of sprays and dusts handled by farmer cooperatives in the United States continued to rise in 1958-59, reaching \$70,118,000. The data for 1959-60 will not be available until later this year.

The quantity of pesticides applied in the United States from the air in 1959 has been reported by the Federal Aviation Agency. No survey was made for 1958. The acreages defoliated, those treated for control of weeds, and those treated for control of brush in 1959 increased over 1957, while insect control dropped 27 per cent. The total acreage treated was 19 per cent less, the weight of dust applied was 16 per cent less, and the volume of liquids sprayed from the air was 19 per cent greater than in 1957.

Fungicides

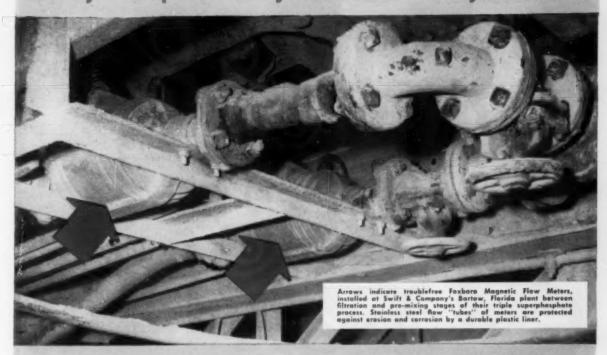
Producers of copper sulfate reported to the U.S. Bureau of Mines that in 1960 they shipped 33,280,000 pounds for agricultural, 40,024,000 pounds for industrial, and 35,240,00 pounds for other uses (chiefly export). The U.S. Bureau of the Census reported 29,-681,000 pounds exported in 1960, the difference due presumably to more material having left the producer's plants for export than had cleared customs by the end of the

Mercury consumed in pesticide production in 1959 amounted to 3,202 flasks (243,352 pounds), or 5.8 per cent of the total U.S. consumption of 4,172,020 pounds. In 1960 pesticides consumed 2,974 flasks (226,024 pounds), again 5.8 per cent of the U.S. total of 3,888,-692 pounds.

Zinc sulfate shipments to agriculture have decreased markedly since 1958. Sales of industrial fungicides, exclusive of wood preserva-

(Continued on Page 142)

"Ornery" Phosphate Slurry Metered as Easily as Water!



... by Foxboro Magnetic Flow Meters at

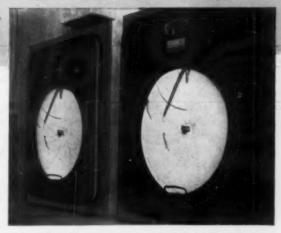
Swift & Company

Measuring slurry is duck soup for two Foxboro Magnetic Flow Meters now used in the production of Swift & Company's Agricola plant food. Here's the story

The company was shooting for uniform pre-mixing and quality control. Needed was an accurate means of measuring the flow of partially filtered phosphoric acid slurry. Orifice plates, or anything that restricted flow, eroded. Pressure taps quickly fouled. Even purged, long-cone Venturi tubes plugged! Solution? Electrical measurement with Foxboro Magnetic Flow Meters. Their smooth, pipelike interiors simply ignore the suspended phosphate solids. There's no erosion, no fouling. Two flush-mounted electrodes "pick up" flow measurement . . . Foxboro Dynalog* instruments record it directly on a linear scale chart. And these records are accurate to 1% of full scale!

Find out exactly how the Foxboro Magnetic Flow Meter works . . . how it can efficiently and accurately meter the "impossible" in your plant. Write for Bulletin 20-14. The Foxboro Company, 139 Norfolk St., Foxboro, Mass., U.S.A.

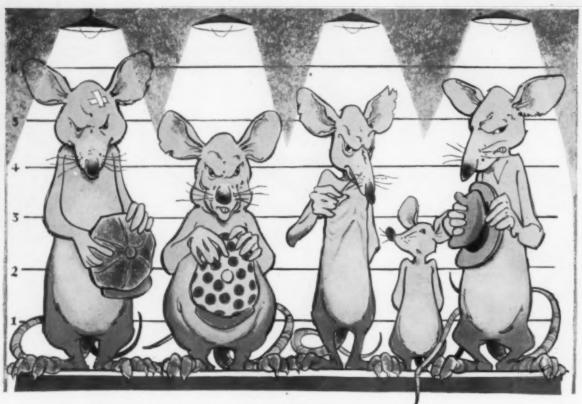
*Reg. U. S. Pat. Off.



By watching slurry flow rates on Dynalog Recorder charts, operators precisely regulate feed of H_2SO_4 to the reacter tanks . . . permitting better quolity control right down the line.

FOXBORO

MAGNETIC FLOW METERS



SAFE and SURE ' WARFARIN GETS 'EM ALL!

Fat rats, hungry rats, strong rats or small rats . . . WARFARIN kills 'em all. Kills mice, too!

World's most famous and most potent rodenticide, WARFARIN is tasteless, odorless, painless. Rats and mice never become bait shy, never build tolerance.

And because WARFARIN is an anti-coagulant, harmless to humans when used as directed, it is approved for use in food establishments and is ideal for permanent bait stations. It's economical as well, since low concentrations give fast, positive results.

Penick has produced DETHMOR® WARFARIN under the most rigid quality controls for 11 years. Ample stocks are always available for fast delivery coast-to-coast.

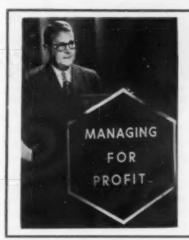
DENICK

Farm Chemical & Insecticide Division

5. B. PENICK & COMPANY . 4161 BECK AVENUE, ST. LOUIS 16, MISSOURI

NEW YORK . CHICAGO . LOS ANGELES . SAN FRANCISCO . PORTLAND, ORE.

Managing For Profit Is Theme Of IMC Seminar



The fertilizer industry is a tough, competitive business that is not returning profits commensurate with the money invested, the talents employed, or the position it holds in the total economy. The industry needs to revolutionize and speed up its selling practices.

Richard A. Lenon. IMC's treasurer, outlines successful financial management principles to fertilizer industry executives.

ANAGING for Profit . . . and more specifically, "Managing a Fertilizer Plant for Profit" was the theme of a 3-day seminar sponsored by International Minerals & Chemicals Corp. for some 70 executives in the fertilizer industry. The Fertilizer Management Seminar, held July 19-21 at IMC's offices in Skokie, Ill., was the second such meeting for fertilizer management. Tom Ware, IMC president, reports the seminar is "a natural outgrowth of IMC's policy of customer service." In outlining IMC's position as sponsor. Mr. Ware observed, "we realize and accept that our future growth and progress is directly proportional to the growth and progress of our customer group - as you grow and prosper, so do we, for we are both dependent on a healthy strong, and profitable industry for our mutual success."

Len Gopp, IMC vice president for sales of the Agricultural Chemicals Division, suggested to the fertilizer executives that it might be well for the industry to adopt some hard sell and dramatics in an effort to move its goods to the farmer.

"All of us are agreed." he said. "that the fertilizer industry is a rough, tough competitive business that is not returning profits commensurate with the money invested in capital equipment, the talents employed, or the very important position it holds in the total economy. Similarly, I think we would all call it a good business and certainly it is essential. Not only does it help feed our nation, but the people beyond our borders as well. It is not a business that rises and falls in line with fads, styles or public whim. It is a business for which there is an essential need - one whose existence is certain so long as plants need nitrogen, potash and phosphate. Yet, despite all thes? favorable attributes, the facts still remain that our products are sold on a very small margin of profit

and the quantity of product used is well below the accepted standards of good fertilization practice. Now we can blame the lack of fertilizer sales on all kinds of reasons - on the weather, on the farmer's ignorance of good fertilizer practice, on price, or any of a dozen other reasons. And each of these probably is valid to one degree or another. But, when all is said and done, I think the big reason fertilizer sales are not what they should be is that we, collectively, have done a poor selling or merchandising job."

"I am convinced," said Mr. Gopp, "that the fertilizer industry will never lift itself to its rightful stature unless it revolutionizes and speeds up its selling practices."

The IMC Fertilizer Management Seminar included all phases of management of a profitable fertilizer manufacturing business. A marketing plan — including study of the market, sales goals, etc, — was just one part of the overall program of Managing for Profit. A brief review of the other subjects follows:

Administration and Management the principles and skills required to manage a profitable fertilizer business, setting concrete objectives, methods of measuring performance and how to motivate employees.

Financial Management — Profit Planning — setting financial objectives in every phase of the business and how to set yardsticks to evaluate results.

Accounting — how cost accounting and modern reporting methods can spotlight important information.

Credit and Collections — how much credit should be allowed a customer? when should credit be granted? — how do you set up an effective collection system?

Insurance — types of insurance needed in a fertilizer business — what each policy covers and how to evaluate your insurance requirements.

Purchasing — how to carry on an efficient purchasing operation — how to select suppliers, and how to control purchasing.

Personnel Development — how to improve personnel performance and motivation of personnel toward increased productivity.

Production — how to reduce costs through scheduling.

Public Relations — how a fertilizer manufacturer establishes, develops and improves community relations, handling press and news releases, and how to get product publicity.

Future Trends, Product Innovations, Growth Possibilities.

Transportation and Distribution — including how to reduce your costs by better selection of transportation.

Marketing — development of a complete marketing plan, including a study of the market, planning sales goals, and developing advertising and promotion; — use of radio, newspaper, outdoor and display advertising.

'Sales Management — setting up sales territories, determination of size of sales force, selection and training of salesmen, how to compensate the sales force and working with dealers.

The fundamentals and principles of management in each of the areas outlined were presented



A portion of the capacity audience of more than 70 fertilizer industry executives who attended the three-day Fer-

tilizer Management Seminar at International Minerals & Chemical Corp., Skokie, Ill.

In analyzing the shifting mar-

through the vehicle of a case study of a theoretical company, the "Makmor Fertilizer Company." The Makmor Company was completely described and analyzed: its staff, financial statement, physical location, equipment and processes, competitive situation, etc... and with this background, partial solutions to the specific problems of Makmor in each subject area were presented.

ket, Makmor attributed part of the percentage sales decrease in his company's share of the market to construction of two new fertilizer plants in the area in 1955. But he recalled that even at the peak of this year's rush season, some customers were turned away because the company couldn't supply certain of the mixed grades in demand. These customers presumably went to Makmor's competitors this spring — and they might continue to do so in the future.

The next step was to analyze the potential market for the various grades of mixed fertilizer. This again, was accomplished with the use of statistics from the U.S. D.A. and other sources, plus knowledge of the trends in the area.

Heimberg continued: "Makmor tried to keep up with grade trends by estimating what sales he had been forced to turn away each season and then adjusting production the next season by that amount. But he had consistently fallen short of the mark in whatever the heavy-selling grade happened to be. He usually found his company winding up with too much of the other grades that were not in demand."

After a detailed grade-by-grade analysis, Makmor determined that

Examining Market Analysis Problems

THE following summarizes E.
Heimberg's (IMC's manager
of marketing analysis) examination of the Makmor Fertilizer
Company's market analysis problems.

"We first took a look at where Makmor sold its products," said Heimberg. "We found that most of the customers were concentrated in a 16-county area within a 50mile radius of the plant."

Next step in the study was to obtain a U. S. Department of Agriculture Consumption Report on Commercial Fertilizers and Primary Plant Nutrients. Total tonnage of mixed fertilizer in each of the 16 counties was tabulated and Makmor determined that 133,500 tons of mixed fertilizer were con-

sumed within the 16- county market area during the 1953-54 season.

Makmor's sales of 20,240 tons in this close-in area accounted for 15.2 per cent of the total. The study also pointed up Makmor's heavy sales concentration in this area, with 80 per cent of its sales recorded within the 16 counties.

President Will I. Makmor was surprised to learn that a similar analysis of the 1958-59 market and sales showed there had been a significant change in the market picture. The company's share of the 16-county market fell from 15.2 per cent to 13.1 per cent. And its sales in the concentrated area (as compared to the total business done by Makmor) fell from 80 per cent to only 68 per cent.

SALES BUILDER:

Now your customers can control destructive late-season insects up to 24 hours from harvest with Phosdrin[®] Insecticide without creating residue problems.

Phosdrin is the remarkable new phosphate insecticide that gives your customers fast knockdown and kill of the toughest insects then disappears without leaving any residue.

Here is how Phosdrin works. And how Shell is getting the story to your customers.

A LATE-season insect build-up can quickly make your customers' crops unsalable. If these infestations are controlled with an insecticide that leaves excess residue on the crops at harvest, they are still unsalable.

Phosdrin solves the problem

This is a problem that many growers are solving with Phosdrin Insecticide. Phosdrin kills the toughest insects fast (including strains resistant to other insecticides), usually within a few minutes of application. However, unlike most other insecticides, Phosdrin disappears rapidly after it has done its job, leaves no residue.

That is why Phosdrin can be ap-



Free—promotional material to help you sell your brand of Phosdrin.



Factual, informative ads like these are telling your customers the Phosdrin story in national, regional and local publications.

plied up to 24 hours from harvest on many crops.

Shell tells your customers the Phosdrin story

Shell is telling your customers the Phosdrin story in magazines, state farm papers, local newspapers and on radio. Some of the advertisements that have run or that are going to run are shown above.

To help you sell Phosdrin at the local level, Shell has prepared a number of leaflets for specific crops, as well as banners, newspaper mats and radio scripts.

All these materials are available from the Shell Chemical District Office nearest you. These offices can also supply you with technical information on Phosdrin and give you valuable assistance should you have a special formulating problem.

Other leading agricultural materials developed and manufactured by Shell Chemical include: aldrin, dieldrin, endrin and Vapona® (DDVP) Insecticides; D-D* and Nemagon* Soil Fumigants and Allyl Alcohol Weed Seed Killer.

Here are the addresses and phone numbers of Shell Chemical's District

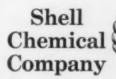
1220 W. Goodale Blvd. 2299 Vauxhall Rd. Columbus 8, Ohio Union, New Jersey HU 8-0752 MU 6-9580

HU 8-0752 MU 6-9580

119 S. Claiborne Ave.
New Orleans 12, La.
529-1561 VO 3-0800

55 Marietta St., N.W. P.O. Box 2099 Atlanta 3, Georgia Houston 1, Texas IA 5-2986 CA 7-7655

> 100 Bush Street San Francisco 6, California EX 2-5400





Agricultural Chemicals Division

the adjustment to changing trends in four grades had consistently underestimated the change. In each of the four grades, rates of change were less than the average change for the state.

It was evident that more sensible policy would be for Makmor to adjust production of these grades more sharply than the average. For example, instead of the indicated 19.5 per cent increase in production of 5-20-20, a better ad-

justment would be on the order of 25 per cent.

Such progressive planning would eliminate tying up needed storage space with slow-moving grades, and would allow quicker turnovers and increased volume. This type of advanced adjustment would also help eliminate the need to dump or force the slow-moving grades on a market that will accept them only at a price.

(Continued on Page 136)

There is a constant flux in demand for many mixed grades of fertilizer. An immediate problem is the firm's conveyor system, which is overdue for replacement.

New selling techniques must be given to Makmor's sales force to meet the competition's efforts and to increase over-all sales volume. Community relations have suffered because of the fumes produced by the Makmor plant.

Accurate budgeting has become increasingly important to Makmor's financial program in order to take advange of seasonal discounts available on raw materials.

The IMC answer to these and other problems is contained in the book. Each chapter deals with a specific area of plant management. The sections were prepared by the IMC executives who presented them at the seminar.

The book, which cost \$12.50 a copy to publish, provides a verbatim record of the presentations given at the seminar.

Specific chapters of "Managing For Profit" deal with: administration and management; financial management; profit planning; accounting; credit and collections; insurance; purchasing; personnel development; production; public and community relations; future trends; transportation; modern marketing; market analysis; advertising and promotion; and sales management.

In all of these categories, Makmor's problems and marketing situations were carefully analyzed, and appropriate actions prescribed.

Industry comments on IMC's first Fertilizer Management Seminar (in the Summer of 1960) indicated that the type of information presented was actually put into use by many of those who attended. Several delegates said the seminar could be made more beneficial if the discussions could be documented for future reference. And the book "Managing For Profit" is IMC's method for answering this request.

Seminar Text Published In Book Form



MANAGING FOR PROFIT, a book just published by IMC, is presented to M. C. Morton (left), vice president of sales. Central Chemical Corp., Hagerstown, Md., by A. E. Cascino, vice president of marketing for IMC.

HOW can efficient management brighten the profit picture of an average-sized fertilizer manufacturer?

With this basic question in mind-and many other areas to be considered in detail-a book entitled "Managing For Profit" has been published by International Minerals & Chemical Corporation, Skokie, Ill.

The book has a two-fold purpose: to review fertilizer management practices and to suggest specific ways to improve operating efficiencies.

The 445-page book was used by IMC as the reference text for a 3-day Fertilizer Management Seminar held at the firm's Administrative Center in Skokie, in July. It contains sections on both the theory and actual practice of sound management.

The theoretical section is a reprint of IMC's Full Orbit Manual collection, a series of sales-oriented booklets given to manufacturers.

The theories were brought to life in the three-day seminar through a hypothetical company in "Fertile Valley, Illinois," known as the Makmor Fertilizer Company. President and principal spokesman for the company is Will I. Makmor.

Two hundred pages of the book, which is being distributed to all IMC customers, are devoted to helping Makmor solve its current problems and to suggesting methods of increasing profits.

The Makmor idea was developed to simulate operations of a typical fertilizer producer's plant, with a full-time employment of 12 and an additional 20 part-time employes added during the 60-90-day spring rush season.

Makmor's problems are many, varied, and typical. Competition is increasing from the five other producers already located in Makmor's sales area.

WHAT ARE DRI-SOL BENEFITS IN MIXED-FERTILIZER PRODUCTION?

REDUCED SHIPPING COSTS

BETTER PROCESS CONTROL

LOWER FORMULATION COSTS

LOWER DRYING COSTS

A DRIER PRODUCT

INCREASED PLANT CAPACITY

FASTER CURING-QUICKER SHIPMENT

IMPROVED FERTILIZER QUALITY



More and more fertilizer manufacturers are turning to DRI-SOL ammoniating solutions as a sure, time-tested way to lower production costs and improve mixed-fertilizer quality.

For in addition to the eight cost-saving and quality-building advantages shown above, DRI-SOL can also help manufacturers offset the high water content of low-strength acid. It also helps to produce grades which are

difficult or impossible to make with conventional solutions.

What grade of DRI-SOL meets your needs best? From a wide choice of formulations you can select the solution that offers you the greatest number of advantages. Each grade contains less than 0.5% water. Grades range from 24% ammonia and 76% ammonium nitrate, to 50% ammonia and 50% ammonium

nitrate, and are generally available in all the Southern and Midwestern States.

Why not get complete information? Technical data to fertilizer manufacturers available upon request. Write: Agricultural Chemicals Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York. Offices also located in: Atlanta, Shreveport, St. Louis.

COMMERCIAL SOLVENTS CORPORATION



The Development Of

Pesticide Specifications*

There is a definite tendency for the formulations developed by federal agencies to exert a standardizing influence on all pesticide formulations. Military specifications, for example, set requirements for minimum p,p'-DDT content early in DDT's use and these requirements largely set the standard for today's product.

by Elmer E. Fleck

Entomology Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.

ALTHOUGH the federal government has been a major source of specifications for pesticide formulations, it does not undertake to write specifications for all useful pesticide formulations. It confines itself to areas where it has problems, the solution of which requires the purchase of rather large amounts of pesticide formulations. The purpose of the specifications is to insure the purchase of formulations that will do the job at a price arrived at by competitive bidding by industrial formulators.

Since the interest in pesticides in both the military and civilian agencies is rather broad, the result has been the issuing of well over 100 specifications for pesticide formulations. For the most part, this article will be limited to insecticide formulations, but similar procedures apply to other pesticides.

A result of this accumulation of specifications has been that agencies outside the federal government frequently use them for their own purchases, even though they may or may not describe the best formulation for the purpose. This situation probably is due to the lack of other readily-available sp.> cifications. The World Health Organization has adopted many of these documents. Thus, there is a definite tendency for the formulations developed by federal agencies to exert a standardizing influence on all pesticide formulations.

This influence is exemplified by DDT. Military specifications set requirements for minimum p,p'-DDT content early in its use and these requirements largely set the standard for today's product. Similarly, specifications for aerosol containers and formulations set high standards that contributed greatly to the success of these containers and formulations on the civilian market. The emulsifiable concentrates and the high percentage wettable-powders are other products that became generally known through their widespread use in military operations. The granular formulations of insecticides currently are undergoing large-scale use due to their large-volume application in white-fringed beetle and imported fire ant eradication programs carried out by the U. S. Department of Agriculture.

Types of Specifications. In general, federal agencies use four types of specifications for insecticides: (1) Purchase descriptions, (2) Army, Navy, and Air Force Specifications, (3) Military Specifications, (4) Federal Specifications. Purchase descriptions are merely descriptions of the material desired and are used for filling small needs or for materials that are needed on an emergency basis. They are issued by all government agencies and are of a temporary nature. Army, Navy, and Air Force Specifications cover items specific to the use of one of these military services. Military Specifications are complete documents and are used when the need for the material is confined to more than one military service. It is the policy of the Department of Defense to recommend that any formulation that has uses in civilian agencies be issued as a Federal Specification. This latter type is issued by the General Services Administration

^{*}Presented at the Symposium on New Trends in Pesticide Formulations, American Chemical Society Meeting, St. Louis, Mo., 1961.



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Most of the government's insecticide specifications have resulted from research conducted by the USDA's Entomology Research Division for the purpose of solving military insect control problems of either a medical or engineering nature. This cooperative arrangement started in World War II.

either as an Interim or as a regular printed Federal Specification. As the name implies, the Interim document is temporary and further development leading to later issuance as a Federal Specification is contemplated.

How They Start. Any nonmilitary agency in the government can start a specification by informing the General Services Administration that they have a need to purchase a considerable amount of a formulation. If they have a specification for the material already prepared, it can be issued promptly as an Interim Specification. Otherwise General Services Administration will request an appropriate government agency, experienced in the field, to prepare the specification. This agency could be the U. S. Department of Agriculture, the Bureau of Standards, or when rodenticides are involved, the Fish and Wildlife Service.

In the Department of Defense, each service has two using groups, the medical and engineering. Any group may decide that a new pesticide formulation is needed and may prepare a specification or request another agency to prepare it. To avoid overlapping or duplication, the Bureau of Ships monitors all military specification projects. If the specification is to be issued as a federal document, the Bureau of Ships coordinates the action for the Defense Department and forwards the document to the General Services Administration for additional coordination with other interested agencies of the Federal Government.

Most of the insecticide specifications, however, have resulted from research conducted by the

U. S. Department of Agriculture in the Entomology Research Division for the purpose of solving military insect control problems of either a medical or engineering nature. This cooperative arrangement started in World War II with a transfer of funds from the Office of Scientific Research and Development to the Entomology Research Division. After the war, this cooperative research was supported for several years by funds from the Office of the Surgeon General-Army, the Quartermaster General-Army, and the Corps of Engineers. Entomological research was conducted at the Orlando, Florida laboratory of the Insects Affecting Man and Animals Research Branch and chemical research at the Beltsville, Maryland laboratory of the Pesticide Chemicals Research Branch. The cooperation now is continuing between the Department of Defense, and the U.S. Department of Agriculture, and is based on a memorandum of understanding: the program is supported by a direct appropriation from Congress. The needs of the Department of Defense are made known to the U.S. Department of Agriculture largely through the Armed Forces Pest Control Board. This board is composed of representatives from all branches of the military service concerned with insect and rodent control.

To illustrate how this cooperation works, let us assume that a medical unit of one of the military services finds that it needs a new formulation to control an insect of medical importance. The need is cleared through their standardization units and a request is made through the Armed Forces

Pest Control Board to the U.S. Department of Agriculture for such a formulation. This request then is translated into a research program at Orlando, Florida to determine the best material and formulation for control of the insect. Specific directions for use will be developed and these will be sent to Beltsville for the drafting of a specification. Here, the chemical standards for the insecticidal material will be set and analytical and test methods will be developed to insure the quality of the finished formulation. The rough draft of this specification then will be circulated to probable formulators, to insure that the formulation can be readily produced commercially, and to requesting agencies and other federal agencies for comments. The military services will add their packaging requirements and inspection and procurement procedures. The directions for use and the labeling will be cleared simultaneously with the Pesticides Regulation Branch of the U.S. Department of Agriculture for compliance with the Federal Insecticide, Fungicide and Rodenticide

Responses obtained will include the official title and number, and these are then incorporated in a final draft that will be issued either as a Military Specification or a Federal Specification. Copies of Military Specifications may be obtained from Naval Supply Depot, 5801 Tabor Ave., Philadelphia 20, Penna., Attn. C. D. S. The Federal Specifications are available from the Business Service Centers of the General Services Administration.

How Revised. As need arises for correction or revision, a request is made to the Bureau of Ships or the General Services Administration. Simple amendments or corrections are issued by the agency that issued the specification. A more extensive revision will go through much the same procedure used to develop the specification, including circulation to government departments and industrial formulators for comments.



Now Chief Kay-Two-Oh can take time out to enjoy the Harvest Moon as he listens to the Indian Love Call with his Sweet Sioux - because he knows that it takes more than a moon, or even a medicine man, to bring in a good harvest.

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Lack Of Imagination In Selling Is Said To Hurt Fertilizer Industry

"The fertilizer industry has every reason to be proud of its products, but it cannot be proud of the weak, timid job it has done in merchandising these products. Probably ne other industry has used so little imagination in selling." There is need for better management practices on the part of the dealer. Dealers should get to know their products better and they should know what the product will do for the customer. They also should give better service to customers.



M. E. Wierenga

HE fertilizer industry offers products that perform miracles in raising production and lowering unit cost on the farm. Wise use of fertilizer generally returns three or more dollars for every dollar invested. In many instances, the return runs to seven dollars per dollar spent. Few, if any, other farm production tools can boast such a handsome return," according to M. E. Wierenga, vice president, California Chemical Co., Ortho Division, Richmond, Calif., who spoke at the Southwestern Fertilizer Conference and Grade Hearing, July 19 to 22, in Galveston, Texas.

Mr. Wierenga added that the fertilizer industry has every reason to be proud of its products, or at least of what its products have accomplished. However, he said, the fertilizer industry cannot be proud of the weak, timid job it has done in merchandising these products. Probably no other industry, he

said, has used so little imagination in selling.

Growers are interested in results — not fertilizer, he continued. Yet, the fertilizer industry consistently has based its appeal on price per pound or per ton of plant food. This, he said, has led growers to the practice of continuous shopping for better deals, and the fertilizer industry has been willing to condone, and, in some cases, actually encourage it.

The lack of imagination by industry and the willingness to meet any price quotation has, no doubt, often contributed to the erroneous belief, among farmers, that the profits in fertilizer are large, he continued.

Why doesn't the fertilizer industry employ some sales imagination? Mr. Wierenga asked. Perhaps it is because the management generally is in the hands of production-minded men. Perhaps there are not enough specialists in advertising and marketing — or that they may have too little say-so in company policy, he suggested.

There are signs of encouragement, he continued. A few companies are starting to sell results – make money for growers – not save money. Some companies are training a sales force to use imagi-

nation and sell results — not products or prices. Mr. Wierenga expressed the hope that this trend will speed up.

A panel discussion at the meeting covered the topic "Where Are We and Where Should We Be?" It was moderated by John E. Hutchinson, director of the Texas Agricultural Extension Service, who observed that fertilizer is a real bargain, with farmers getting back \$3 for \$1. Serving on the panel were Woody Miley, Extension Department, Arkansas, and John Cox, extension department, Louisiana. The panel presented the accompanying statistics to show the amount of fertilizers actually used in Arkansas, Louisiana, Oklahoma, and Texas, as compared with the optimum. (See Table on Page 34.)

Samuel Tisdale



A second panel, moderated by Dr. Samuel Tisdale, Sulphur Institute, covered the subject, "How are We Going To Get There?" Kenneth Bates, University of Arkansas, talked on the intensified



New Tractor Shovel brings new economies to Swift & Co.

Michigan introduces Model 55B, early buyer likes its mobility, increased production capacity

5,400 lb lift capacity. Buckets from ¼ to 2 yds (1 yd standard). Turn radius, only 11'2". Torque converter, power shift, power steer... these perhaps are the more important specifications of the new Michigan rear-wheel-steer Model 55B. Its main benefits: excellent maneuverability plus more capacity than previously available in its price class. Sales record to date: excellent. Example: Swift & Company's Plant Food Division.

Swift, we're proud to report, in just a few months has put Model 55B's to work in company plants in Wisconsin, Iowa, Texas, Louisiana, Georgia, North and South Carolina—in most cases alongside other Michigan models! Their experience in Madison, Wisconsin, is typical...

Turns in 11'2"

Here, Swift uses their 1 yd 55B with three other Michigans. A 16 cubic foot Model 12B Michigan unloads boxcars and feeds the raw material to bin conveyors. Raw storage bins to mixer, the material moves in the bucket of a 1¼ yd Model 75 Michigan. Transportation from mixed product bins to two shipping mill conveyors is the job of another Model 75 and the new Model 55B.

The 55B, with its 11'2" turn radius, has been especially productive in locations where smaller bins and narrower aisles restrict maneuvering room.

300 ft cycle: 60 loads hourly

Pictures show the 66½ hp machine feeding 6-24-24 granulated fertilizer... one cubic yard, 1890 lbs per bucket load, 60 loads per hour. Average haul, 150 feet one way. All told, the four Michigans cover an area of 36,000 square feet, help make over 100 kinds of fertilizer, 95% of it bagged.

No lost time

Conditions provide a severe test of both men and machines. The air is very dusty. Material is abrasive and extremely corrosive. During the two or three month rush season machines must work 20 hours a day... full tilt all the time... hitting the piles hard, reversing fast, driving fast. Performance? The oldest Michigan, a Model 75 bought in February 1956, has in 12,000 working hours lost virtually no assigned work time! Efficiency has been equally good for the other three Michigans, including the year-old Model 55B. "Good, rugged units," is the way Swift's Madison plant manager summarizes it. "Our Michigans sure do a lot of work for us!"

Michigan is a registered trademark of CLARK EQUIPMENT COMPANY

CONSTRUCTION Machinery Division



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Fertilizer U	se Compared	With	Optimum P.O.	Needs K O
Arkansas				-
Needs (tons)		193,698	136,997	132,496
Used (1959-60))	87,381	47,515	56,694
Percent of nec	ed used	38	27	38
Louisiana				
Needs		208,642	106,995	107,895
Used (1959)		55,759	23,188	19,733
Percent of nee	ed used	26	21	18
Oklahoma				
Needs		197,686	212,912	160,679
Used		24,700	42,500	8,700
Percent of nee	ed used	12.5	20	5.4
Texas				
Needs	1	.351,795	739,597	335.710
Used (1959-60)	170,118	89,338	25,152
Percent of nee		12.6	:2.1	7.5

soil fertility program in Arkansas which now has two soil test laboratories—one at the University of Arkansas, and one at the Cotton Branch Experiment Station, Mariana, Arkansas. They are processing 50,000 soil samples annually, he said. One of the most valuable aids in our soil fertility project, Mr. Bates said, is that the county agents

now are basing their recommendations to farmers on the soil tests.

Murray Renick, president of Rolla Feed Mills, Rolla, Missouri, pointed out the need for better management practices on the part of the dealer. He asserted that dealers need to know their products better. They need to know what the product will do for the customer, and they should give better service to the customer. Mr. Renick stressed the importance of



Murray Renick

cutting expenditures, the value of advertising and of employing welltrained personnel. Courtesy also is extremely important, he concluded.

Dr. Tisdale summarized the program by saying that experiment stations should investigate crop yields. Soil tests, he said, are a necessity for a good system of agriculture, and, he added, the fertilizer industry can be expected to provide more service in the future. The industry will sell on the basis of a farmer's needs, he concluded, and it should realize a profit.

The Southwest Fertilizer Conference will be held next year on July 18 to 21, in the Galvez Hotel Galveston.

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Arcadian News

Volume 6

Nitrogen Division, Allied Chemical Corporation

Number 9

Crop Yields and Prices Indicate Good Fertilizer Market for 1962

High crop yields along with increased government payments to farmers for reduced acreages of cash crops are promising indications of a good fertilizer year in 1962.

According to the latest crop report, the corn acreage in 1961 was down 18%, but the acreage planted to corn averaged 57.5 bushels per acre. This record-breaking average means a big drain on plant food. Based on known plant food requirements, the 1961 crop of corn (grain, not including stover or silage) removed from the soil 1,508,549 tons of nitrogen, 586,489 tons of phosphoric acid and 418,872 tons of potash.

Much of the acreage planted to corn did not get good fertilization, due to the late, wet spring season and the delayed announcement of the feed grain program. This means that many farmers who failed to use enough fertilizer in 1961 will be better prospects in 1962.

Fertilizer Can Boom

Looking ahead to a continued government feed grain program next year, fertilization of the corn acreage actually planted should boom for several reasons. More of the acreage will be concentrated on good land owned by farmers who fertilize as a matter of practice. Livestock men who feed their corn are faced by higher cash grain costs, and will be anxious to use enough fertilizer to grow

ESTIMATED PLANT FOOD REMOVAL BY MAJOR CROPS IN 1961 (Based on latest forecast production figures, August 1, 1961)

(pages on latest lorocast broadering upages, trapas,					
	Tons of N	Tons of P ₂ O ₃	Tons of K ₂ O		
CORN (3,352,037,000 bu.)	1,508,459	586,489	418,872		
COTTON (13,918,000 bales)	278,522	139,261	92,818		
WHEAT (1,204,096,000 bu.)	752,501	376,245	225,745		

Plant food removed is calculated: on CORN for grain alone not including stover; on COTTON for lint and seed, not including stalks, leaves and burrs; on WHEAT for grain, not including straw.

more feed for themselves. And government payments on acreage reduction will bring farmers ready cash earlier in the fertilizer buying season. The traditional response of farmers to acreage reduction programs can be expected to work even stronger in 1962—to cause more fertilizer to be used on better-tended acres.

With the cotton crop estimated at 13,918,000 bales, as compared to last year's 14.3 million bales, but well above the 10-year average, another large-acreage crop has removed 278,522 tons of nitrogen from the soil, along with 139,261 tons of phosphoric acid and 92,818 tons of potash. More of this land is in the cotton area stretching from the Carolinas to Texas this year, since acreage was reduced mainly in the new cotton areas of

California, Arizona and New Mexico. With cotton markets good and stored cotton supplies down, the cotton acreage for next year can hold up well—and the market for cotton fertilizer should be strong.

Less Land-More Fertilizer

Wheat growers are now voting on the 1962 marketing proposal to cut wheat acreage 10% and to increase the support price from the present \$1.79 to \$2.00 a bushel. More fertilizer on fewer acres again! Sorghum and other feed grains will also be on a reduced acreage basis next year. But soybeans, sugar beets and certain other crops can be expected to call for more fertilizer tonnage and greater acreage in 1962.

(Continued on following page)



(Continued from preceding page)

The trend of the times, with or without government farm programs, is toward more efficient farming. This calls for greater output with less labor. More farmers each year are finding that it pays to use more fertilizer per acre, whether they farm fewer acres or more acres. And in spite of any one year's government programs, as the number of farms goes down, the survivors are farmers who use more fertilizer.

For example, look at our total production of all crops. At its peak in 1960, farm production was up to 122% of the 1944-49 average. Yet this all-time high production came from 320,823,000 harvested acres, compared to 350,000,000 acres we harvested just after World War II. This trend is possible only as we use more fertilizer to keep each acre producing more. As we look ahead to 1962, fertilizer is going to be even more important to prosperous farming.

Farm income is good this year, and land and labor costs will stay high or go higher, while the cost of fertilizer stays relatively low for its value. Government programs are limiting acreage of more crops, and are pumping extra money into agriculture. County agents, vocational agriculture teachers and other agricultural experts are preaching the gospel of more efficient farming on every acre left in production. All these trends favor heavier use of fertilizer in 1962.

Make premium grades with DURANA

It will pay you to use DURANA Nitrogen Solution to produce tobacco fertilizers, specialty fertilizers or other premium-grade fertilizers containing nitrate nitrogen, ammonia nitrogen and water-insoluble organic nitrogen.

DURANA supplies all these forms of nitrogen at low cost in one ammoniating solution containing a total of 37% nitrogen. Through the proper use of DURANA in manufacturing complete fertilizer, approximately 20% of the nitrogen from the solution is converted to water-insoluble inorganic nitrogen in the process of making the fertilizer.

DURANA also helps give fertilizers excellent mechanical condition and facilitates the production of granular-type fertilizers. For more information about DURANA, contact Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

TIPS ON DRYING

Drying granular material is similar to drying a bathing suit. You must persuade the water molecules to leave — permanently. A wet bathing suit in an off-ocean breeze and hot sun dries slowly, but a dry land breeze will remove moisture quite rapidly.

With wet granular material, part of the water is on or near the surface and part is trapped inside each granule. What happens if you heat the granules without much air circulation? The surface water evaporates until the surrounding air is nearly saturated, and then the water vapor in the air returns to the granules as fast as the remaining water departs. To break this stand-off we need a dry breeze, and we get it by putting more air over the material.

Stop a minute and consider that this surface water problem is distinct and separate from the problem of moisture trapped inside the granules. Removal of surface water requires relatively large quantities of air and moderate granule temperatures. Because evaporation of surface water tends to keep granules cool, it usually is not necessary to worry about overheating the material.

With counter-current drying, there often is so little air that some of the moisture picked up from warm material near the discharge of the drier may be deposited on cooler material farther back in the drier. Remember that every pound of water evaporated absorbs more than 1,000 B.T.U's. (This will cool 40 pounds of air about 100°F.) 1,000 cubic feet of saturated air at atmospheric pressure and 60°F. weighs about 75 pounds.

Once the surface water is gone from granular material through plenty of air circulation, we must free trapped moisture from inside the granules. How do we get this moisture through the surface? We start the water particles moving around by heating the granules. The particles try to migrate to the surface. Here we often have difficulty because many granular materials form a hard, nearly impervious coat when their sur-

face is dried quickly. When this coat is not formed, drying proceeds without any special problems.

If a surface coat is formed, then more time and higher temperatures are needed to allow trapped moisture to escape. Or, a special technique is required.

In drying clay materials, formation of a hard coat is prevented by keeping enough moisture in the air to avoid hardening of the surface. At the same time, clay temperature must be raised so that moisture working its way to the surface can escape faster than moisture in the air can enter.

Design of modern driers includes equipment to regulate retention time. air quantity and velocity, inlet and exit air temperatures, inlet and exit moisture content of the material and of the air. Although operating conditions are quite flexible, there are limits to the performance that can be expected from any drier. For example, retention time can be increased by reducing revolutions per minute, but the material at the lower speed may not "shower" enough to make good contact with the heating air. An increase in air quantity above recommended levels may dry the material and carry most of it out of the drier!

In this article, we have assumed that heat is being carried by the drying air and not by direct radiation. Driers that allow the material to "see" the source of heat may create enough radiant energy to overheat the granules. In such cases the drier manufacturer should be consulted to learn if a barrier of some type, such as a combustion chamber, can be interposed.

In general, remember to follow two rules: (1) be *sure* to have enough air in your drier to carry away surface water, and (2) allow enough time for trapped water in the granules to escape.

New U.S.D.A. Yearbook

You'll want the valuable new reference book for agricultural dealers and farmers, the new 1961 Yearbook of the U.S. Department of Agriculture, entitled "Seeds." In 591 pages packed with useful information, this volume covers the production, processing, certification, testing and marketing of all kinds of seed crops, including field crops, vegetables, flowers, forest trees and lawn grasses.

NOTE: The information furnished in this issue of the ARCADIAN News is obtained from studies and tests considered reliable; results, however, are not guaranteed.

TONNAGE **OPPORTUNITIES**

Over half of our 21 million fishermen live in the country. As fishing in streams and lakes gets more crowded, farm ponds are growing in popularity for catch" fishing. Fertilizing ponds makes it easy to increase the yield of fish, and also helps keep out undesirable water weeds, which improves the value of ponds for fire control and water supply.

Farm ponds are being dug at a rapid rate with more than a million in the country now. Additional ponds are used for raising bait minnows. And in ricegrowing areas, some land alternates between a crop of fish and a crop of rice. This all adds up to a huge fertilizer

market.

More Fish Grow Faster

For good fishing, every acre of pond water needs 100 pounds of mixed fertilizer, 6 to 12 times a season, starting in early spring and ending in fall when the water gets cold. Some pond owners use fertilizer in winter to kill pond weeds. In Florida, ponds can be fertilized, and fished, every month of the year.

High fertility in pond water increases fish production by a chain reaction. The nitrogen, phosphate and potash supplied by commercial fertilizer grow vast numbers of microscopic plants. Insects and other tiny animals feed on these plants. In turn, they are eaten by small fish which are then gobbled up by bigger fish. It takes 4 to 5 pounds of insects for each pound of bluegills or bream. And 4 or 5 pounds of these small fish produces a pound of bass.

Bluegills and large-mouth bass are the recommended combination for stocking warm water ponds in which the surface temperature reaches 85°F. or more in summer. Rainbow and brook trout do well in spring-fed or other cold water

Fertilizer Helps Farmers **Grow Big Crops of Fish**

ponds where the summer temperature seldom reaches 75°F. Other fish are sometimes used but the bass-bluegill combination provides the most fishing.

Fertilize in February

Nitrogen and phosphorus are the most important elements in a fish pond fertilizer. If the water is acid, lime should be spread. And 2-2-1 or 1-1-1 ratio fertilizer gives good results. Many of the experts suggest an 8-8-4 or 8-8-2 analysis. Spreading should start by early February in the Gulf States and Carolinas, and in early March farther north. Fertilizer added every 10 days soon produces billions of tiny plants which turn the water a brownish or greenish color. Fertilizer is then added every month

or so. An easy rule is to add fertilizer when you can see your hand clearly as you dip one arm to elbow depth in the pond. A more accurate measure is to nail a white disk on the end of a broom handle. Mark the stick at 12 inches and 18 inches above the disk. The pond is fertile enough when the disk goes out of

sight at 12 inches deep in water. It's time to fertilize when you can still see the disk at 18 inches deep

Deep pond edges and well-fertilized water keep most water weeds out of ponds. This reduces the mosquito nuisance and helps bass catch the small bluegills which might overpopulate a weedy pond. Pond weeds also use up oxygen which the fish need.

Commercial Fertilizer Best

Commercial fertilizer is best for fish ponds. Organic fertilizers favor large weeds and undesirable algae. Spreading the fertilizer is simple. It doesn't have to be spread in deep water, just scattered in shallow water along the pond edges. Wind and water currents mix it thor-

For full information on fertilizing fish ponds, see your county agent, your soil conservation district agent or game warden. And write to the U. S. Department of Agriculture for Farmers' Bulle-tin 2094, "Managing Farm Fishponds

for Bass and Bluegills.

Arcadian NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
\	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urna	Water	Neutralizing Ammonia Per Unit of Total M (lbs.)	Approx. Sp. Grav. at 60° F	Apprex. Vap. Press. at 104° F per Sq. in, Gauge	Approx. Temp. at Which Sait Begins to Crystallize °F
NITRANA"	100	2.03		Part I	1	17.00		1	
2	41.0	22.2	65.0	-	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	-	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	-	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	-	12.0	12.7	1.083	25	-36
змс	47.0	29.7	64.5	-	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	-	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	-	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	-	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	-	5.5	11.2	1.134	22	1
URANA"	STATE	985621	1000	20 ESC	ACTOR	45 94	F 100	NE STE	
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
DURANA"	a Head	1000	50000		13.3	2000	128 20		
BURANA contains 8% formaldehyde.	37.0	13.3	53.4	15.9	9.4	7.2	1.235	0	36
U-A-S"	355	13/4-11	- 37 - 37	3378/8		2013	9 358	13.8	
A	45.4	36.8	-	32.5	30.7	16.2	0.932	57	16
В	45.3	30.6	-	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	-	-	-	24.3	0.618	211	-108

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In Second Year

Sales Development Program Results In 7% Sales Increase

The principles behind Niagara Chemical Division's sales development program apply to any general business, but the program is tailormade for an agricultural company. Its objectives: to increase profitable sales volume; to provide the individual salesman more opportunity to improve his performance; and to upgrade the individual salesman's income.

ITH the initial stage of its new sales development program just completed, Niagara Chemical Division of Food Machinery and Chemical Corporation reports that an evaluation of results to date is highly encouraging. According to E. K. Hertel, manager of Niagara's Agricultural Department, the program can be credited with a 5-7% overall increase in sales during 1960. An examination of records for some individual territory managers has shown increases in sales volume up to 100%.

Niagara's sales development program was instituted two years ago, after successful introduction of a decentralized plan of operation (Agricultural Chemicals, May, 1960) revealed that the sales force required streamlining to keep pace. Hence was born the program which just recently went through its first stage—a series of practical sales conferences for each of the company's 15 regions. These were set up and run by a sales personnel development coordinator appointed especially for the purpose.

Now, stage two is commencing. Here, again, the conference approach is employed, but instead, the individual regions must plan and conduct their own sessions, gearing them to meet regional needs and problems. This stage of the program will be permanent. The sales development coordinator, Glenn Rouse, will continue to be responsible for overall operation and coordination of the program.

Operation of the Program

The principles behind Niagara's sales development program apply to any general business, but the program is tailor-made for an agricultural company. Its objectives, simply stated, are: (1) to increase profitable sales volume by greater effectiveness of the sales force, (2) provide the individual salesman more opportunity to improve his performance, and, thereby, (3) upgrade the individual salesman's income.

Most of Niagara's salesmen have a degree in agriculture, horticulture, entomology, or a related field, but little formal sales training, if any. Hence the initial stage of the sales development program was concerned primarily with sales techniques. Briefly, here is how it worked. A schedule was set up whereby, region by region, conferences were held. In each region, a 4-day district manager's conference was conducted first. Its purpose was to refresh district managers on the principles of selling and further educate them on practical subjects pertaining to their managerial duties-such as inventory control. The latter two days were spent coaching and preparing them so they could assist in conducting a second conference to be staged a few days later. This second conference was a practical series of conferences for territorial managers (general salesmen).

Thus each region had a district manager's conference followed by one or more territorial mana-



Glenn Rouse (standing, left)—sales development coordinator for Niagara Chemical—is shown leading a practical

conference for salesmen. The subject of this particular session is self explained via the chart he displays.

gers' conferences, depending on the size of the region.

District Managers' Conferences

The district managers' conferences actually were preparatory meetings designed to ready the district managers for their part in the sales personnel development program. Four half-day sessions included the following: The district manager's job in setting objectives and planning to meet them; organizing, staffing, and measuring performance; motivation and communications; increasing sales by helping territory managers to develop; and developing tools to plan and control field sales operations. Discussions also were held on such topics as selection, indoctrination, and conference-leading techniques.

Territory Managers' Conferences

The territory managers' conferences generally lasted four days and were limited to from 12 to 15 salesmen (both long term and new). Eight half-day sessions were included.

A unique part of the territory managers' conferences was a live sales presentation which each salesman was required to prepare and present. For this he had to select from his territory a prospect he had previously been unsuccessful in selling, or had not yet called on. He outlined the circumstances to

his fellow salesmen—describing the prospect concerned, reasons given for not purchasing from Niagara to date, and any other pertinent details (Note: the customer might be a grower, a distributor, or dealer, since Niagara sells to all three types). This call actually was to be made soon after the man got back in his territory.

In the sales presentations, one of the district managers or territory managers posed as the customer and the salesman had to attempt to sell him. Upon completion, a critique was held in which everyone present helped to evaluate the good and bad aspects of his presentation. A fellow salesman, for instance, might comment, "If I were Harry I would have pointed out . . ."

These sales presentations were found to be particularly valuable in revealing those sales producing ideas, methods, and techniques others had found successful-and in pointing out improvement opportunities in the particular presentation. The discussions following presentations were aimed at exchanging ideas, knowledge, and experience on the ways a man could think through a particular situation. Using a real, live situation also proved highly practical, as many salesmen reported that they later went out and tried the presentation on the "actual" customer and succeeded in making the sale.

Emphasis is placed "planned" selling. The regional and district managers take an active part in leading and guiding these sessions. Actually, aside from a general outline of subjects, the sessions are developed by the participants on the spot. As a result, interest is keen and all important areas of problem solving and idea sparking are covered. A direct benefit from the program in this area is its aid in enabling sales personnel to analyze their own selling efforts and spot their own improvement opportunities.

Another area that is proving the value of "planning is the "selective-selling" area. Tools have been developed to gather and interpret information on customers and prospects. These aid the individual salesmen in selecting specifically the prospects and customers to develop. One man found that he was spending 80% of his time on accounts that had only 20% of the potential territory business. Another man found that 25% of the accounts with which he was doing business were responsible for 85% of his total volume. Such analyses have aided greatly in planned use of time and in the selection of accounts and prospects.

An example of the ground covered at the conferences can be seen by some of the topics covered in various conferences:

- I. Planning territory coverage: a. Account and Prospect Information Sheet
 - b. Analysis of Customers and Prospects by dollar potential
- c. Work Plan for Territory
 d. Target and Good Approach for Territory Coverage
- 2. Product Analysis. Product "X" characteristics, way formulated and what this means to grower, reseller, etc. Ways to take a product apart and analyze it in terms of end results for customer.



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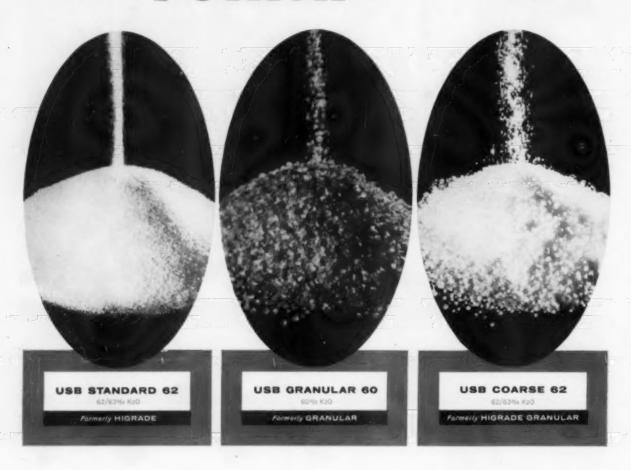
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3. The territory manager's job – working relationship with line sales management, with field and headquarters specialists, limitations on his freedom of action and reasons why (why things have to be checked).

 Basic principles of marketing, with emphasis on their application to the agricultural chemical business.

In all, some 40 territory managers' conferences were required in getting the program launched.

Operating Stage

With the district managers' and territory managers' conferences completed for all regions, the sales development program is out of the preliminary stage and in the "operating" stage. In this stage, the regional managers are charged with full responsibility of implementation. They must see that at least four regional conference sessions are held each year and that the basic selling techniques and aids presented in the preliminary stage are practiced. In carrying this out, they must prepare a yearly conference plan for approval of the Agricultural Department manager and sales development coordinator.

The regional conferences are to be designed specifically to meet the needs of each particular region. They are to deal with sales problems which may arise in the region, new selling techniques and tools, product education, etc.

In addition to these regular sessions being run on a regional basis, occasional "initial" territory managers' conferences are arranged by the sales development coordinator to accommodate new salesmen. This practice will continue. In the past year, for example, a number of new territory managers (or assistant territory managers) joined Niagara. Each has gone or must go through the basic training conference.

An important function of Niagara's sales personnel development program is to upgrade the ability of supervisors in working with subordinates, and improve on-the-job coaching. The program is not a one-time spot deal but a way of managing on a regular basis. That is, the regional manager, district manager, or sales development coordinator periodically accompanies the various salesmen on field calls to see how well the suggestions and practices presented at the territory managers' conferences and the periodic regional conferences are being put to use. These joint calls are not made in a spirit of spying, but, rather, with the idea of lending encouragement and moral support in difficult sales calls and helping the salesman to improve his performance. They also provide a means of evaluating the effectiveness of the sales development program.

History of the Program
In 1959, Niagara did a little
self analysis and concluded that,
(Continued on Page 139)

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AGRICULTURAL CHEMICALS

Washington Orchard Tours

Weather and Mites are Factors In Orchard Pest Control Problems

Early emergence of mites and an unusually long, hot summer have produced new problems for northwestern fruit growers, causing some chemicals, which were effective in previous seasons, to provide disappointments this year. In addition, few new materials are expected to be available for commercial use next season.

by Loren H. Milliman

IF you can get by with the material you are using, stay with it, because it is going to be difficult to get a new material." This was the advice given repeatedly by various scientists during a series of orchard tours in the major fruit-producing areas of the state of Washington. More than 1,000 growers and others interested in fruit production participated in the annual event, sponsored jointly by Washington State University and the Washington State Horticultural Association.

This year's tours lasted more than two weeks and ended in mid-August. Many promising new chemicals are under test to control orchard insect pests, diseases, and weeds, but "unless a miracle happens—and the Food and Drug Administration is rather short on miracles," as one scientist put it few of the new materials will be available next year for extensive commercial use by the orchardists.

Early emergence of mites and an unusually long, hot summer have produced new problems for the fruit growers, causing some chemicals, which were effective in previous seasons, to provide disappointments this year.

Amino triazole, for example, may be registered for use in the orchard in 1962 to control weeds, and several other herbicides are on the horizon that are just as good, but workers at the Tree Fruit Experiment Station in Wenatchee, Wash., were not hopeful of obtaining clearance.

A strange twist in the reaction of stone fruit trees to applications of urea has developed. While it has been known for some time that the pelletized form could not be applied to the foliage, this year the roots are taking up a toxic (for them) material that develops when urea is heated to pelletize it.

As a consequence, recommendations of the WSU experiment station scientists is that the urea be applied in the fall in order to avoid injury to the foliage.

Among the mites, the rust mite and the McDaniel (which closely resembles the two-spot in appearance) have provided the most trouble this year. Pear psylla and San Jose scale have surged back in overwhelming numbers in many orchards, with resistance to several materials being reported by orchardists.

Although the scientists declared that the real problem most often was incomplete coverage, failure to apply sufficient pest-killing material (either reducing the amount per gallon, or skimping on the gallonage per tree and acre), or improper timing, Dr. Stanley C. Hoyt, assistant entomologist at the Tree Fruit Experiment Station, revealed that the first true resistance of rust mites to Tedion had been established in the laboratory there.

The population of the mites jumped to four times what it had been nine days earlier.

SYMBOLS OF PLANT LIFE



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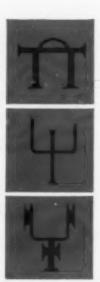
STANDARD HIGH-K MURIATE IS TAILOR MADE FOR CONVENTIONAL FERTILIZER MANUFACTURE AND VARIOUS RATIOS OF GRANULATED GRADES. IT FEATURES UNIFORM PARTICLE SIZE RANGE AND CHEMICAL ANALYSIS.

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Over-wintering forms of the mites were so thick on some trees early in the spring, the buds appeared actually orange toward the end of March, and the mites were depositing eggs by April 4 or 5, he continued. Ordinarily, the first spray for rust mite is not applied until about April 10, when 3 pounds of wettable sulfur per 100 gallons of water is recommended.

This spray apparently failed to kill the eggs, so, if rust mites continue to be a problem, the spray date must be advanced, and 4 pounds per 100 gallons may be recommended, he indicated.

Karathane, in adddition to controlling mildew, appears effective against the mites, according to Dr. Hoyt. He mentioned also Thiodan as a pre-bloom spray which in addition, is an aphicide and controlled cutworms that were a problem this season in the Wenatchee area. Thiodan also was effective as a summer spray for rust mites.

Some of the organo-phosphates which controlled aphids and other insect pests, as a group provided very poor control of rust mites, Dr. Hovt added.

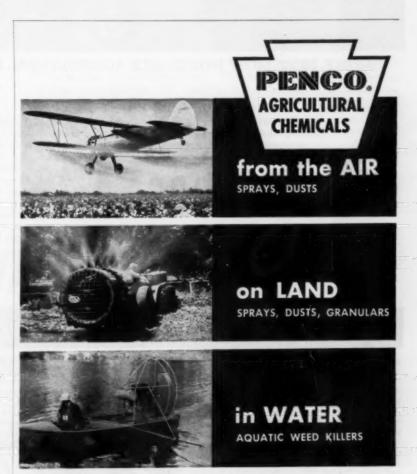
Sevin proved effective against rust mites, but the McDaniel species built up if a miticide was not added. Where the Tedion-Sevin combination was used, very complete coverage was required, because it apparently reduced the margin of error, according to the speaker. Kelthane and Tedion were the two chemicals recommended for McDaniel mite control.

Considerable injury resulted from use of phosphates and oil in tests. Growers were warned that any time oil was used in the orchard in the summer, they were exposing their trees to injury, particularly if fungicides were applied later.

Many of the pest-control products supplied for experimental use by the Bayer laboratories in Germany proved to be very effective miticides, but injury to fruit or foliage was an unwanted side effect, Dr. Hoyt reported. He has been conducting experiments with dinitro compounds which are more effective than DN 111, "and we don't have to worry about the temperature," he revealed. Also, a carbamate in the same chemical group as Sevin has proved effective against both the McDaniel and rust mite, and has provided some control of aphids.

Where there is both a mite and aphid problem, TEPP, in some cases, did little to bring mites under control. Dimethylate "looks good" against both the green and woolly apple aphid as well as against the codling moth, and there is some indication of its being a suppressant on the McDaniel mite, according to Dr. Hoyt.

Many things have caused San Jose scale to provide one of the worst outbreaks in his memory, reported Edward W. Anthon, veteran entomologist at the Tree Fruit Experiment Station. This scale is a constant problem to stone



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fruit growers, and, recently, has again become one to apple and pear growers.

Birds help spread the crawlers, and too much speed with air blast sprayers has resulted in incomplete coverage. If 10% of the scale survive, the orchardist is in for trouble. Where parathion was omitted from the spray schedule because of grower's preoccupation with the mite problem, scale built up rapidly.

Some materials under test are so new and so potent they are being flown in two-gram lots from the German laboratories to Wenatchee, according to Mr. Anthon.

Parathion at 1 pound per 100 gallons killed 99.6% of the scale; Diazinon at 2 pounds, 95.1% and at 1 pound, 91.4%; Sevin at 1½ pounds, 94.5%, and DDT at 2 pounds, 93.5%, he reported.

Sevin is not registered as a post-bloom apple thinner so it cannot be recommended for this purpose, Dr. L. P. Batjer, USDA horticulturist at the Tree Fruit Experiment Station, pointed out, but tests with the chemical for several years have been very promising.

Apples from Sevin-treated trees were slightly smaller than those from trees treated with DNOC, but were significantly larger than those from trees thinned with NAA or NAD. Most important, however, is the strong return of bloom the following year. J. W. Welch, Wenatchee, former member of the Washington State Apple Commission, and one of the state's principal growers, reported during Dr. Batjer's talk that a 35-acre plot thinned last year with Sevin produced an average of 1,000 loose boxes per acre.

A check plot of 8 or 10 acres yielded the same tonnage, but this year the return bloom was only a third of what it was in the other block of trees.

D. R. Bartram, Chelan, Wash., reported that he had used Sevin on eight acres of Red Delicious, Golden Delicious and Winesaps and had obtained a good thinning job with the chemical, harvesting 14,000 loose boxes, which Dr. Batjer described as "a pretty good country average."

That pear psylla may be connected with "pear decline," a disorder which has swept through orchards from British Columbia to California, eliminating thousands of acres of pear orchards, was indicated. Dr. Everett C. Burts, Tree Fruit Experiment Station entomologist, pointed out the significant correlation of the spread of pear psylla and of pear decline.

Most plant viruses are spread by aphids and leaf hoppers, and close relatives of the pear psylla are known to produce plant toxins. The potato psyllid causes symptoms on potato vines which are similar to pear decline. Detailed laboratory and field work demonstrates that the pear psylla is extremely injurious to pear trees, even causing their death in the laboratory, according to Dr. Burts.

Control of pear psylla and a gradual reduction of pear decline

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in the Pacific Northwest appear to be related, he continued. There is no indication psylla have developed resistance to Guthion, he commented in reply to a question from the audience. Instead, in most cases where failure to control the insect was reported, investigation revealed that the amount of chemical used was "far below" the amount recommended.

Application of three sprays of Dilan at the rate of six pounds per acre, with the latest not closer than 60 days before harvest, is not included in the Washington spray bulletin because the chemists at Washington State University are not convinced the residue will be gone, he explained in reply to another question.

Fieldmen for various agricultural chemical companies discussed results of use of their pesticides this season when the orchard tour moved to the Congdon orchards near Yakima. Reuben Gervais, Norken Corporation, Yakima, was discussion leader.

Among the participants were Allen Deichler, Stauffer Chemical Co.: Howard Holgrath, Niagara Chemical Division, FMC; and Hubert Kinney, Chemagro Corpo-

The hot sun tends to break down all chemical combinations, Mr. Gervais pointed out, and an early spring revealed a heavy carryover of insect pests. The combination has caused trouble for grower and fieldman alike, particularly as the new-record temperatures have speeded up generations of mites and some other foes of the orchardist.

Pear psylla control appears most difficult in the Yakima area, Mr. Kinney reported, with some of the fifth instar apparently getting through. In Hood River, Oregon. some growers were using as low as five pounds of Guthion per acre and apparently obtaining control. while in the Yakima and Wenatchee areas they were using from 10 to 12 pounds, with emphasis on the 12.

Warning was issued concerning the possibility of a third brood of codling moths appearing shortly before harvest. At that time, a grower will have a difficult choice to make. He must select a chemical that will not bring his residue over the tolerance, and he must decide whether worms in the apples will cause more cullage than fruit he will lose through bruises and general rough treatment from his spray rig.

(At this point, commercial applicators point out that orchardists can always fly the chemicals on, eliminating soil compaction as well as the risk of bruises.)

Better results are being obtained with the flowable, rather than the wettable, formulation of Tedion, Mr. Deichler summarized his observations. At the recommended rate of two pounds of actual Tedion per acre, this increases the cost to the grower about \$1.50 an acre for material.

(Continued on Page 140)

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2-4 TONS

Model N-28 (2 ton) and the N-48 (4 ton) shown, have unique no-spring, individual wheel suspension-all wheels carry equal weight at all times. These tractor pulled "com-pacts" make money as rental units.

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for further information about the P710 and the N-48, plus a full line of other bulk fertilizer spreaders and bodies, bulk feed bodies, bulk and sack bodies and unloaders.



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Stainless Steel on all Critical Corrosion Points

· All-Weather Wheel Drive



Model P710 shown, has a 7 ton capacity. Other "P" models available from 4 to 13 tons. All "P" models are available in 3 spreading widths, and can accurately spread by test-75 lbs. per acre on up.



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Tri-Basic Copper Sulfate can be used in spray or dust form on practically all truck crops and many fruit crops in the control of persistent fungus diseases. It is compatible with other pesticides and gives the added advantage of correcting nutritional deficiencies where there is insufficient copper in the soil.

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For samples or literature make request on your firm's letterhead.





Reporting on IMC's second Fertilizer Management Seminar:

"Years of top management experience packed into 3 priceless days!"

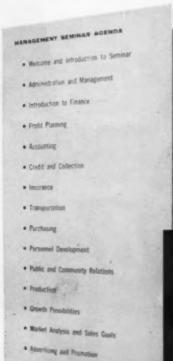
... unanimous opinion of over 60 fertilizer industry executives who attended IMC's pace-setting Full Orbit demonstration of total service to customers



Guest speaker Jehn A. Baker, Director of Agricultural Credit said, "As your most important customers, farmers appreciate the centinuing research conducted by the fertilizer industry, and the constant improvement in your products."



No organization can have clear cut programs without definite objectives and rigidly defined responsibilities. Here R. J. DeLargey, V.P. of IMC's Technical Division, presents the fundamentals of managing for profit.



* Sales Management

· Conclusion

Rulling a Mediating Program

"Shirtsleeve" sessions took participants through complete set-up of the Makmor Company, an imaginary fertilizer company. Included management, sales, finance, market analysis, compensations. Typical is the market potential phase led by Anthony Cascino, IMC Marketing V.P.

MC FERTILIZER



Over 60 management representatives of the fertilizer manufacturing industry heard IMC Management officials outline and discuss the requirements for profitable management and selling.

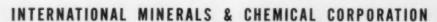
Fertilizer company partners, presidents, general managers and other executives from all over the nation, took active part in IMC's highly successful "Managing for Profit" Seminar, July 19, 20 and 21 at Skokie, Illinois.

Top IMC management specialists — representing every important department of fertilizer operations — led practical discussions on a variety of subjects . . . ranging from "Introduction to Finance" through "Building a Marketing Program".

Objective of this Seminar — to help fertilizer management reduce in-plant processing costs, improve marketing and merchandising activities, manage for more volume and profit!

Your IMC representative can fill you in on all the information covered during the Seminar.

This IMC-sponsored conference is another example of the Full Orbit concept — a concept dedicated to **Total Service** in the fertilizer industry!



Agricultural Chemicals Division. Materials Dept. . Administrative Center . Skokie, Illinois



Ag-Cat Users Cite Economy

"Working side by side with 450-Stearmans, the Ag-Cat will do about one-fourth more acres per hour, and will do it on \$3 less fuel—with additional savings on maintenance and overhaul."



DESPITE its relatively high initial cost, the Grumman Ag-Cat is proving to be one of the most economical airplanes available, according to a survey recently conducted by the Grumman Aircraft Engineering Corp., Bethpage, Long Island, N. Y. The survey covered aerial operators who have

used the Ag-Cat during the past season.

Operational data derived from the survey are shown in the accompanying table. The figures indicate that the Ag-Cat can handle a heavy work-load with comparatively little maintenance time required. Among the comments received by Grumman in addition to survey statistics is one from Dale Tillay of Blue Mountain Aviation & Dusting Corp., Walla Walla, Washington, who said, "Working side by side with 450-Stearmans, the Ag-Cat will do about one-fourth more acres per hour, and will do it on \$3 less fuel — with additional savings on maintenance and overhaul."

David Setter, president of Weslaco Flying Service Weslaco, Texas, told Grumman, "Our present feeling is that the Ag-Cat can replace our Stearmans, make us more money, help us to continue our safety record, and send our pilots home at the end of a long day with a lot more left-over energy."

Emery F. Lyon, president of Lyon Flying Service, Welsh, Louisiana, reported, "As far as hopper loads and acres per hour, we found the Ag-Cat could out do the 450-Stearmans on two gallons per acre spraying, but on all the fertilizing, regardless of poundage, there was very little difference in acres covered per hour. Size of field and ferrying distance were the only thing that made much difference between the two in this department. In rice planting, here again the 'Cat had the advantage, because of

(Continued on Page 148)

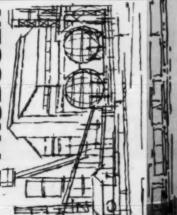
AG-CAT FIELD OPERATIONAL DATA

Based on 200 to 300 Flight Hours Per Aircraft

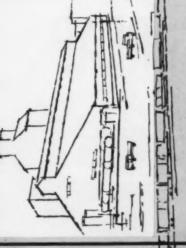
	Low	High	Avg.
1. Fuel (Gal./Hr.)	13.9	15.5	14.5
2. Oil (Qts./Hr.)	.5	1.	.85
3. Hopper Load (Lbs./Flt.)	1175	1350	1240
4. Acres Covered Per Hour:			
a Spray (1-3 gal. per acre)	43.6	200	178
" (10 gal. per acre)	70	78	72
b. Dust (25 lbs. per acre)	47.7	150	126
c. Fertilizer (100 lbs./acre)	60	70	65
" (200 lbs/acre)	14	46	42
d. Seed (Rice planting)	60	70	65
" (30 lb. acre, alfalfa &			
grass typical)	100	100	100
5. Hours down for engine maintenance	None	10	4.75
6. Hours down for aircraft repairs	4	24	11.25
7. Hours down for prop maintenance	None	4	1.5
8. Hours down for dispersal equip-			
ment repairs	None	Frequent	9
9. Time spent in cleaning aircraft at			
end of day	15 min.	l hr.	35 min.
10. Average size of field (acres)	30	80	53
11. Average length of field (miles)	1/4	1/2	3/8
12. Average time to turn-around (seconds)	10-15	25-30	19
13. Level of pilot fatigue	Low	High	Low
14. Maneuverability	Excellent	Excellent	Excellent

All operators reported ferrying and working speeds of 80 to 85 miles per hour

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REAVESTE.

& ⊗ ⊗ **3rd Applicator's Conference**

The third annual Agricultural Chemical Applicator's Conference for the Pacific Northwest is scheduled to be held October 9 and 16 at the Chinook Hotel in Yakima, Washington. The conference is sponsored by the Norken Corp. of Yakima and attracts applicators from Montana, Idaho, Oregon, Washington, and from parts of Canada and California.

The theme for the meeting will be "New Agricultural Chemicals." This will include discussions of new registrations and new tolerances for established products. The second day of the meeting will be devoted to a display of equipment, both for ground and aerial application, and will be held at the Yakima Municipal Airport.

Among those who are expected to address the applicators are Chester Feinberg, Diamond Alkali, Portland, Ore., who will speak on Dacthal, a pre-emergence herbicide; Arthur Fah, American Cyanamid, Yakima, on a new formulation of amino triazole; Gordon Brandes, Rohm & Haas, Philadelphia, on nickel sulfate as a rust control on wheat; Gustave Poletis, Geigy, Yakima, on new products; Philip Watke, Amchem Products, on chemical winter fallow; and Nicholas Sander on potato problems.

Manufacturers have been most cooperative in arranging for displays of their products, according to Dr. Robert E. Jones, president and general manager of Norkem Corp. Originally the conference was limited to aerial applicators, but so much interest has been shown by ground applicators that the scope of the sessions has been widened, Dr. Jones added.

TAAA Plans November Meeting

The Texas Aerial Applicators Association will hold its 1961 annual convention November 9 to 12. The site has not yet been selected. Piper Scholarship Funds

The Piper Aircraft Corp., Lock Haven, Pa., has contributed scholarship funds of \$1,200 to applicants for enrollment in the second annual Aerial Applicator Short Course at Ohio State University's School of Aviation in Columbus, Ohio.

Being offered Sept. 5 through Oct. 6, the course includes instruction on all phases of aerial application. Enrollment is limited to persons holding a valid commercial pilot certificate with 500 hours solo experience in aircraft of under 350 hp or the equivalent.

The ground and air classes are taught by experienced instructor-duster pilots. Each student receives 15 hours of dual and 15 hours of solo application time in addition to ground instruction.

The Nitrogen Division of Allied Chemical Corp., New York, also has made scholarship funds available to students at the short course.

BAUGHMAN LIQUID FERTILIZER SPREADER

RAPID SPREAD

A new, uncomplicated design with 40 to 60-foot spreading pattern!

The Baughman Rapid Spread Liquid Fertilizer Spreader is a completely self-contained unit; can be mounted on flat bed truck or farm wagon in 10 minutes. Spreads liquid in droplets instead of usual mist spray — fertilizer is applied more uniformly, doesn't drift away on windy days. Operates on compressed air. Efficiently constructed to give trouble-free service.

- All moving parts located away from contact with corrosive acid-base fertilizer.
- Compressed air heats and agitates fertilizer to prevent sludging in cold weather.
- Standard model holds 1000 gallons;
 other sizes built to order.



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A few choice dealerships available in selected areas.

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325 SHIPMAN ROAD . JERSEYVILLE, ILL.



Because the fruit and vegetable crops were treated with

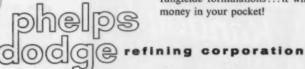
TRIANGLE BRAND COPPER SULFATE

Regular or basic copper sulfate should be mixed in insecticide-fungicide sprays and dusts to insure appetizing, attractive fruits and vegetables that consumers "reach for."

When used in fertilizers, Triangle Brand Copper Sulfate helps to enrich the soil, resulting in healthy, profitable crops.

Help your customers produce more profitable crops. Use regular or basic Triangle Brand Copper Sulfate in your fertilizer and insecticide-

fungicide formulations...it will mean more money in your pocket!



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High-Concentrate Sprayer Offered By Marlow Pumps



The compact, Econ-O-Mist sprayer is shown attached to a standard three-point tractor hitch during field testing operations. The unit is 75 per cent smaller than comparable sprayers.

A compact, air-blast mist sprayer, that is driven by the same engine that drives the tractor to which it is attached, has been developed by Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J. The sprayer, called "Econ-O-Mist," has been field tested for two years in orchard and grove operations.

The Econ-O-Mist fits easily on a standard three point tractor hitch. Since the power comes directly from the tractor, the spray volume automatically is coordinated with the ground speed, thus preventing over-saturation when turning or slowing down. Only four feet long, the Marlow sprayer is more than 75 per cent smaller than comparable orchard spraying equipment, a factor that facilitates high maneuverability. In fact, the complete unit, tractor and sprayer, can make a 360° turn within its own length.

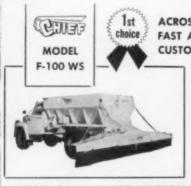
Among the advantages claimed for the compact mist blower by its manufacturer are less equipment downtime, because of its ability to run 1½ hours or more between fillings, a reduction in fuel consumption, because of the elimination of sprayer and pump engines, and the "Econ-O-Mist"'s light weight of less than 1,300 pounds, which reduces soil compaction.

A further advantage is simplicity of design — only six spray nozzles on one side, finger-tip control for one-man operation, and compactness that allows the unit to be sheltered easily.

Agavenco Catalog

A complete aerial spraying equipment catalog, illustrating and describing individual components and systems for airplanes and helicopters, has been prepared by the Agricultural Aviation Engineering Co., Santa Clara, Calif.





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 ACCURATELY PER ACRE
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- TWIN DISTRIBUTOR GEAR CASES ARE TOTALLY ENCLOSED, ELIMINATING NEED OF COSTLY U-JOINTS BETWEEN CASES.
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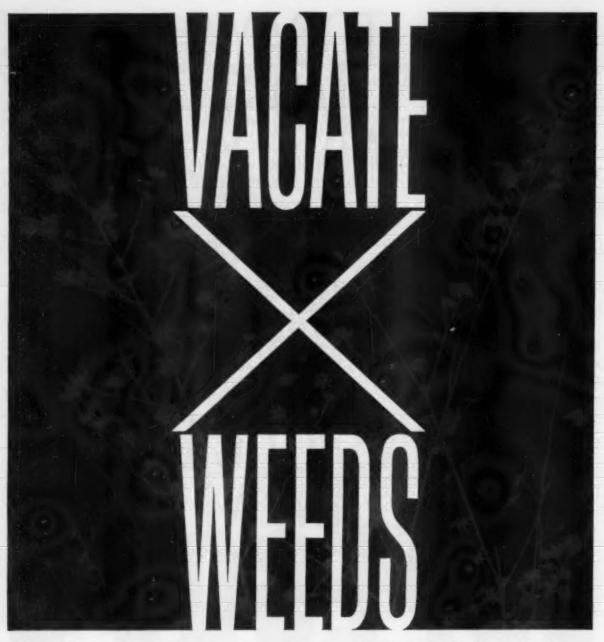
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This is it. The herbicide you hoped would come. The weed and grass killer that lasts more than one year. A patented feature of this killer is the chemically combined water which makes it dust free. It can be applied any time (most economical results are from spring or late fall spreading). It is easy to handle—requires no mixing, hauling water, or using expensive equipment.

This is Diamond's new VACATE, and it has many physical advantages over previous formulations for battling weeds and grass. VACATE offers economy of application and efficiency in performance.

VACATE can be used anywhere a weed- and grass-free

area is desirable. It controls all vegetation. Normal rainfall starts action—a total accumulated rainfall of an inch is ample. And it is safe . . . noncorrosive, nonflammable, and nontoxic. You ought to know the whole story. Write Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

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AGRICULTURAL CHEMICALS





by Kelvin Dorward

Grasshopper Problem Remains Serious Despite Controls

THE grasshopper control programs reported in June were completed by early July, but economic populations still were present in many areas late in the month. Grasshoppers were infesting 80,000 acres of range and croplands in Klicitat County, Washington, and 20,000 acres in Garfield County. Counts were especially high in areas of intermingled crop and range. Damage continued to occur in several Utah counties, and some migration was reported in both Nevada and Idaho.

The grasshopper problem remained serious in several areas of South Dakota. Considerable control work was underway in the north central area, especially in Hughes and Sully Counties, to protect corn and alfalfa. It was expected that controls would continue as long as there was a chance of a corn crop. In areas of North Dakota, there was considerable movement into croplands, with controls being applied. Populations ranging from light to severe were found in Minnesota. Counts of 40-65 per square yard in alfalfa, roadsides and soil bank lands were found in a number of areas, but very little damage had occurred. Damage to hay crops in Wisconsin was expected to exceed that of 1960. Some treatments were underway in the northwest part of the

The European corn borer was of concern in several areas. In the Hudson Valley of New York, damaged ears of picked sweet corn ranged from 5-75 per cent. Populations were estimated to have been as high as in 1956 which was the outstanding borer year of the 50's. Infestations in Massachusetts were severe, with the second brood expected to be underway by the last of July. In Vermont the insect was expected to be a pest of sweet corn for the rest of the season.

In the Corn Belt, the European corn borer was generally light, but some spotted, heavy populations were present. Larval counts in southwest Minnesota were 251 per 100 plants. In one field in Jackson County, Illinois, the average was 3 borers per plant. This was very high for that area of Illinois. The early threat in Iowa was about over by early July, except in the northern third of the State. Most fields in the southern two-thirds of the State showing 75 per cent of the plants with leaf feeding had received treatment.

The first generation of the European corn borer on corn in Arkansas was the heaviest in many years; probably the heaviest since the species entered the State.

During early July, pea aphid counts were very high in Colorado, ranging up to 500 per sweep in Mesa, Delta, and Montrose Counties; and controls were needed in the heavily infested fields. However, by the latter part of the month, counts were down considerably. Heavy populations were reported in localized areas of New Mexico. Although controls were satisfactory, reinfestation was rapid. Slight increases were reported from Minnesota and Idaho, but the insect was more numerous than usual on second crop alfalfa

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Survey & Detection Operations, Plant Pest Control Division. U. S. Department of Agriculture. His observations are based on latest reports from collaborators in U.S.D.A.'s pest surveys throughout the U. S.

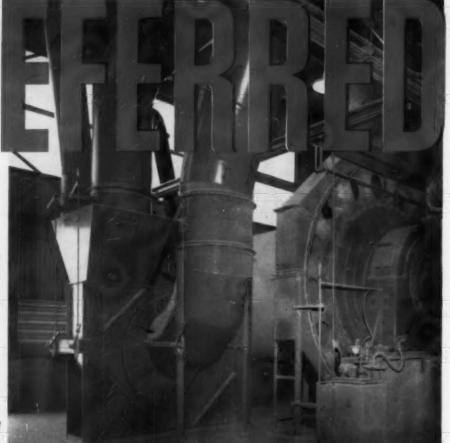
and red clover in Rhode Island. The spotted alfalfa aphid was on the increase by late July in Oklahoma, New Mexico, and Colorado. The aphid was taken in Harrison County July 25 for the first collection this year in Indiana. The first activity in Nebraska since April was reported from several counties.

The European red mite was one of the most active fruit pests during July. The mite was increasing rapidly in Vermont early in July and was heavy locally in Connecticut. In New Jersey, populations were rather easy to find and a potentially bad situation existed. Inspection and controls were recommended. Increases were noted in Delaware, Wisconsin, Michigan, Missouri, and Utah. The mite continued to be a problem in the Vincennes, Indiana area.

The Mexican bean beetle was perhaps the most prominent truck crop insect during July. The insect was widespread on beans throughout Arkansas, and controls were recommended. Activity was on the increase in Alabama and populations were unusually high in Delaware. Local injury to beans was reported from Colorado, Wyoming, and Utah. Surveys failed to show the beetle in the previously infested Jerome, Idaho, area.

The boll weevil, which in early July was a problem only in (Continued on Page 148)

PR



This installation of the Davison Chemical Division, W. R. Grace & Company at Bartow, Florida, typifies industry's preference for Kennedy.

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air swept grinding systems boost phosphate tonnage

The Phosphate Industry has experienced a tremendous growth in capacity over the past few years. It is significant that a majority of these installations have included Kennedy Air Swept Grinding Systems and Kennedy Air-Float Conveyors.

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by Paul Miller

This department, which reviews current

Fungicides For Control Of Southwestern Rust Of Cotton

NCIDENCE of southwestern rust (Puccinia stakmanii) of cotton in Texas, New Mexico, Arizona, and in northern Mexico fluctuates from season to season and from locality to locality depending upon abundance of summer rainfall, according to Lester M. Blank (1), who reported results of fungicide tests conducted jointly by the Crops Research Division, Agricultural Research Service, United States Department of Agriculture, and the University of Arizona Agricultural Experiment Station. In favorable seasons, the rust causes considerable losses in affected plantings. Control measures attempted or suggested so far have not been practicable. Benefits from local eradication of the alternate host, grama grass (Bouteloua spp.), on which the overwintering stage of the rust is produced, are cancelled out by the probability of long-distance air transport of rust spores. Tests of cotton varieties and species have shown all commercial varieties grown in this hemisphere to be highly susceptible to the rust. Fungicides have heretofore not given promising results.

In greenhouse evaluation tests with various fungicides applied as sqrays, Dr. Blank found some to be very effective for control of the rust, whereas some others were only partially effective and many were ineffective. The tests demonstrated, also, that control resulted only when the fungicide was applied before the cotton plant was exposed to rust inoculum; in no case did an application made after infection took place give control.

Field-plot trials were made in cotton-growing areas of southern Arizona where rust had been prevalent in previous years. In 1956 and 1957, the tests were inconclusive because of scarcity of the rust. In subsequent years, however, enough rust was present to permit fungicide evaluation. Of the materials tested in 1958 and 1959, zineb, dodine, and an experimental material composed of zineb and nickel chloride were considered to be highly effective.

In the 1960 experiments, zineb provided a high Jegree of control; it was superior to other fungicides tested that year. Dodine and ziram were somewhat less effective, and thiram gave no control. Plants treated with zineb had fewer rust lesions than untreated plants and retained their leaves and continued active growth. Yield of seed cotton in the zineb plots was about 50% more than in untreated plots. Treatment with dodine and ziram resulted in slight yield increases, whereas the thiram treatment was without appreciable effect, according to Blank.

The success of the 1958 and 1959 field-plot trials led to applications of zineb on a commercial basis by a number of growers in 1960. Results were similar to those obtained in the plot experiments.

In his conclusion, Dr. Blank reemp'hasized the importance of applying the fungicide before the plant is infected by the rust fungus. Applications made after infection had taken place were not beneficial. The preliminary studies indicated, however, that zineb applant disease problems, is a regular feature of AGRICULTURAL CHEMICALS. The comments are based on observations of collaborators of the Epidemiology Investigations, Crops Protection Research Branch, USDA, Beltsville, Md.

plied to the foliage at the proper time is very effective for control of cotton rust.

Field Spraying with Dyrene

G. B. Lucas (2), of North Carolina State College, reported briefly on results of field tests of 2,4-dichloro-6-(o-chloroanilino)-striazine for controlling tobacco brown spot (Alternaria longipes). In some years, the disease causes serious losses in North Carolina. In 1959 and 1960, brown spot was the most important tobacco disease in the State; losses in these 2 years were estimated at \$21,000,000 and \$9,500,000, respectively.

Preliminary tests, in 1958 and 1959, with Dyrene as a spray had given promising results, and in 1960, more extensive field plot trials were set up. Treated plots were sprayed one, two, or three times at weekly intervals at the beginning of the harvest season (just after flowering). At the end of the harvest season, brown spot was present in all plots and seemed to be causing considerable damage, especially in unsprayed plots. Plots that received three weekly sprays of Dyrene, however, produced higher per-acre yields of higher quality tobacco than unsprayed plots; yield averaged 230 pounds more per acre, selling price 4 cents per pound higher, and per-acre value \$167 more. Plots given only one or two sprays did not produce consistently higher yields or give

(Continued on Page 147)

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For weed control in corn. One application controls annual broadleaf weeds and grasses all season. Safe to handle, non-irritating. At higher dosage rates, used for non-selective weed control around farms and industrial sites.

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For weed control in corn and in nurseries. One application at planting time in corn or to certain established nursery stock, provides season-long control of broadleaf weeds and grasses. Safe to handle, non-irritating. At higher dosage rates, used as a non-selective herbicide for industry.

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For correction of minor element deficiencies in ornamentals, fruit trees, vegetables and turf. Compatible with most commonly used insecticides, fungicides and fertilizers.

For correction of iron deficiency Sequestrene 330 Fe Iron Chelate for use in alkaline or acid soils

Sequestrene 138 Fe Iron Chelate - for use in calcareous or other highly alkaline soils

Sequestrene Na Fe Iron Chelate for use in acid soils

For correction of manganese deficiency Sequestrene No₂ Mn Manganese Chelate



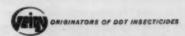
METHOXYCHLOR

INSECTICIDE

Multi-purpose insecticide with residual action against many insects attacking forage crops and stored grain, and for control of many insect species on fruit and vegetable crops, Direct application to livestock controls horn flies, cattle lice and ticks.

CHLOROBENZILATE

Sate, effective, economical miticide for use on deciduous and citrus fruit, ornamentals and nursery stock. Long residual action. Non-irritating to skin, relatively non-toxic to humans and animals. Does not affect insect parasites and predators or bees under normal field conditions. Compatible with phosphate insecticides and copper sprays.





PRODUCTION ROUND TABLE

In-Plant Shrinkage Is Important Operating Factor

HE losses of plant food in processing fertilizers are being recognized as an important factor in the profitable operation of the fertilizer plant. Until about 15 years ago, shrinkage losses in manufacturing were comparatively small. Generally, the practice of the industry was to figure a 20% shrinkage as adequate to cover all losses in the plant. Since then, with the upgrading in the plant food content of fertilizers, and the new technology involving ammoniation and granulation, the process losses in plant food have grown into a major problem.

An NPFI Task Force on In-Plant Shrinkage was formed in 1958 to study the problem, and survey fertilizer plants to determine the actual extent of shrinkage in fertilizer plants. Results of the survey confirm the important factor loss of plant food represents in cost of operation of a fertilizer plant. Results of the survey were released last month, and are summarized as follows:

Operators of granulation units anticipate higher nitrogen losses than operators in non-granular plants; they report allowances in their formulations averaging about 3.4% of the total nitrogen guarantee as an anticipated loss; and they report an average loss of 1.5% nitrogen as unintentional loss.

Dust losses contribute only a minor part to the over-all material loss in granular as compared with non-granular plants. This is indicated in the data relating to phosphates and potash which must be lost as dust in dryers, coolers and ammoniators. In non-granular plants the over-all loss in phosphate and potash averaged 2.15%; in granular plants, phosphate average losses amounted to 2.85% and potash losses to 2.54%. Apparently the major problem in granular plants is concerned with losses in nitrogen chiefly as ammonia, smoke and fumes.

Plants and companies vary widely in reported losses, particularly with respect to nitrogen, due largely to differences in formulating policies: these involve use of higher percentages of anhydrous ammonia versus solutions and solids and higher rates of ammoniation of phosphates.

Based on the reports in the Survey, granulating plants lose on average from 4% to 6% of the nitrogen; 2% to 4% of the phosphate; and 2% to 3.5% of the potash input. Plants producing nongranular fertilizers lose on average from 1.5% to 3% of the nitrogen; 2% to 3% of the phosphate and 2% to 3% of the potash input.

The Task Force on In-Plant Shrinkage comprised the following: Dale C. Kieffer, Smith Douglass Co.; J. E. Reynolds, Davison Chemical Co.; M. D. Sanders, Swift & Co.; Rodger C. Smith, Eastern States Farmers Exchange; Albert Spillman, Fertilizer Manufacturing Cooperative, Inc.; Philip E. Stone, Virginia-Carolina Chemical Corp.; and Vincent Sauchelli, NP-FI, chairman.

Influence Of Formulation On Sprays For Wheat

TABORATORY tests were made in a study to determine the degree of toxicity and repellency to the rice weevil, Sitophilus oryzae (L.), and the confused flour beetle. Tribolium confusum Duv.. of selected dosages of malathion (5 p.p.m.), methoxychlor (15 p.p.m.), and synergized pyrethrum (pyrethrins-1.5 p.p.m.+piperonyl butoxide-15 p.p.m.) applied to wheat in sprays formulated as solutions, emulsions, and wettablepowder suspensions; the residues remaining on wheat at various intervals after application of sprays; the proportional amount of residue on the wheat related to each formulation that is removed by the usual handling and cleaning practices followed at milling; the residues finally resulting in the

milled fractions; and the effect on quality of bread as evaluated by taste and odor panels. Two temperature levels and two levels of moisture content were incorporated in the series of tests composed of 36 primary lots of treated wheat and an equivalent amount of unsprayed wheat for appropriate controls.

Differences between formulations in the effectiveness of insecticides applied in sprays as protectants against insect infestations in stored wheat were not clearly defined, but differences between the two species of test insects in their response to protective treatments were of particular significance. S. oryzae appeared to be more susceptible to the toxic effects of in-

(Continued on Page 145)



RE-NEUTRALIZERS & REACTORS

This new Sackett package is used in conjunction with either a rotating shell or pugmill type ammoniator. It includes a stainless steel reactor tank, gearmotor-driven high speed agitator, Has-telloy "C" and/or stainless steel spargers and an

Write or call us today for attractive price of this package unit.



SACKETT TIMKEN BEARINGS

Strictly a heavy-duty bearing designed for shock loads and around-the-clock

Available in pillow blocks, take-ups and special flanged mounts.



SACKETT BELTRAINER Self-Cleaning PULLEYS

Sackett BELTRAINER Self-Cleaning Pulleys solve two of the most difficult problems encountered in obtaining satisfactory belt conveyor performance. They effectively train the belt by keeping the center on the terminal pulleys. They have no surfaces on which materials can accumulate. These highly efficient pulleys, especially when used with the exclusive Sackett UNI-FRAME Belt Conveyor Design, offers the ultimate in trouble-free, long life belt conveyor service.

MILL & FACTORY SUPPLIES

Sackett maintains complete stocks of replacement parts and factory supplies for immediate shipment.

- . ELEVATOR CHAIN
- . FLEVATOR BUCKETS
- . ELEVATOR SPROCKETS
- . SACKETT TIMKEN PILLOW BLOCKS
- . AUTOMATIC ELEVATOR TAKEUPS
- . BELT CONVEYOR COMPONENTS
- . POWER TRANSMISSION EQUIPMENT



SPECIALIZED ENGINEERING AND BUILDING SERVICES

Sackett is thoroughly qualified to design, fabricate and construct the following plants:

> Diammonium Phosphate Plants Nitric Phosphate Plants **NPK Slurry-Type Granulating Plants TVA-Type Granulating Plants** Triple and Single Superphosphate Plants Liquid Fertilizer Plants Iron Ore Pelletizing and Briquetting Plants **Oyster Shell Crushing Plants**

The extent of our services is not limited to the design and construction of the building, but embraces, as well, the fabrication of equipment in our own shops, and installation supervision of the production equipment required for such facilities, and the training of the customer's personnel during the initial testing and operating phases of such plants.

PLANT MODERNIZATION PROGRAMS

If your operating costs are playing havoc with your profits, then you owe it to yourself to investigate an invaluable service being offered by the Sackett Organization to improve your competitive situation through a modernization of your existing facilities.

We are thoroughly qualified to execute programs of this kind with a minimum of interference with production operations and with maximum re-use of serviceable existing equipment.

Numerous programs of this kind have been successfully accomplished by us during recent years at a substantially lower capital expenditure than would have been re-

quired in the construction of new facilities.

CREATIVE DESIGNERS AND BUILDERS OF PROCESSES FOR INDUSTRY

THE A. J. SACKETT & SONS COMPANY

1737 S. HIGHLAND AVE., BALTIMORE 24, MARYLAND

PHONE BRoadway 6-4466

TWX BA 46

PROCESSES

COMPOUNDING GRANULATING AMMONIATING ACIDULATING EXTRACTING MILLING AND CLASSIFYING DRYING AND COOLING

PRODUCTS

AFRATORS AIR OPERATED EQUIPMENT

AMMONIATORS BAR MILLS

BELT CONVEYORS BLENDERS

BUCKET ELEVATORS CHAIN MILLS

CLASSIFIERS CONCENTRATORS

CONTINUOUS SCALES

COOLERS (HORIZON-TAL & VERTICAL

DE-AERATORS

DRYERS (OIL & GAS-FIRED

ELEVATOR DUST ARRESTORS

EXTRACTORS FUME SCRUBBERS

GRANIILATORS HAMMER MILLS

LUMP BREAKERS

MIXERS MULTIPLE WEIGH

HOPPERS

PUG MILLS PULVERIZERS

REACTORS

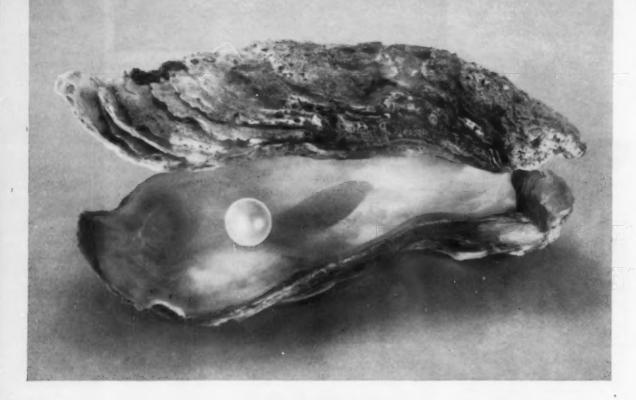
ROTARY KILNS

SACKETT TIMKEN ROLLER BEARINGS SACKING MACHINES

SCREENS WEIGH FEEDERS



Sometimes you get more than you expect...



Hi-Flo® Gran-U-Lated Triple Superphosphate . . . gives you Consistent Uniformity . . . and the famous Davison "plus" factors

Yes, Davison does give you something extra. In every field there is always one particular brand that is head and shoulders above competition. Davison's Hi-Flo Gran-U-Lated Triple enjoys that enviable spot in the phosphate field . . . a position it has earned through years of use. And you get a double guarantee. A guarantee of a minimum 46% APA . . . plus consistent uniformity of particle size, dust-free character and an ability to hold its shape without crumbling.

Another extra you get from Davison is Service. Deliveries are prompt. Quality is dependable . . . and when you need Technical Assistance, Davison's knowledge is at your disposal.

Quality is still the most important thing . . and you get it in Hi-Flo Gran-U-Lated Triple Superphosphate. But the extras you get from Davison . . are like finding a pearl . . . in every oyster.

Your Davison representative is probably in your area right now. If you want to see him immediately, simply phone SAratoga 7-3900.



Hi-Flo® Gran-U-Lated Triple Superphosphate 46% APA • Hi-Flo® Run-O-Pile Triple Superphosphate 46% APA • Hi-Flo® Blend-Phos Triple Superphosphate 46% APA • Granulated Diammonium Phosphate 16-48-0 • Run of Pile Normal Superphosphate 20% APA • Granulated Normal Superphosphate 20% APA • Granulated Normal Superphosphate 20% APA • Granulated Normal Superphosphate 20% APA • Phosphate 20% APA • Phosphate Superphosphate 20% APA • Phosphate Superphosphate 20% APA • Phosphate Superphosphate 20% APA • Granulated Normal Superphosphate 20% APA • Phosphate Superphosphate 20% APA • Granulated Normal Superphosphate 20% APA • Phosphate Superphosphate 20% APA • Granulated Superphosphate 30% APA • Hi-Flo® Blend-Phos Triple Superphosphate 46% APA • Granulated Diamonium Phosphate 16-48-0 • Run of Pile Normal Superphosphate 20% APA • Granulated Diamonium Phosphate 16-48-0 • Run of Pile Normal Superphosphate 20% APA • Granulated Diamonium Phosphate 30% APA • Phosphate APA • Granulated Diamonium Phosphate 30% APA • Phosphate APA • Granulated Diamonium Phosphate 30% APA • Phosphate 30% APA • Granulated Diamonium Phosphate 30% APA • Phosphate 30% APA • Granulated Diamonium Phosphate 30% APA • Phosphat





by Donald Lerch

Farm Bill Seen As Boon To Agricultural Chemical Sales

I NCREASING sales of pesticides and fertilizers! This is one meaning of the 1961 omnibus farm bill, according to some farm experts here.

Despite the large number of acres to be withdrawn from production in 1962 (some 35 million acres now in corn, milo, wheat, and barley), they predict that farmers will use more input items of all kinds.

The reason given is that higher farm prices, which they see ahead, will encourage farmers to grow more on their limited acreages. This means greater use of pesticides and fertilizers.

But it also means increased efforts of farmers to improve their over-all good farm management. NAC already has recongnized this trend by cooperating with the U. S. Department of Agriculture in preparing a TV feature on the role of pesticides in better farm management.

The National Plant Food Institute long has promoted fertilizers to bankers, as well as to farmers, as needed ingredients in cutting production costs and boosting net profits on the farm. We can expect that one outcome of the 1961 omnibus farm bill will be even greater stress by both associations on how to use chemicals to improve farm management.

Other effects expected from the farm bill: high feed costs for livestock growers, higher food costs to consumers, higher federal government payments to farmers, and increasing government intervention in agriculture.

Research Appropriations

While not so highly publicized as the farm bill, appropriations for USDA research disclose that Congress wants to continue and to increase efforts to make agriculture ever more efficient.

USDA's Agricultural Research Service budget for fiscal 1962 has been increased by \$4,203,000 over fiscal 1961. About half of this increase is to operate the new National Animal Disease Laboratory in Ames, Iowa. The remainder of the increase will go largely to operate the new boll weevil laboratory at State College, Mississippi, and the new grain insects laboratories at Tifton, Georgia and Brookings, South Dakota. In the 1962 appropriations, USDA also received \$425,000 to construct a building for research on biological controls of pests at Columbia, Missouri. This is expected to be completed and ready for staffing in about two years.

Significantly, the ARS budget for entomological research has continued to increase. It rose from \$5,598,000 in 1960 to \$7,927,000 in 1961, and will go up again to \$8,664,000 in 1962.

Increasing farm production efficiency is not the only spur for increased research. USDA economists predict that by 1975 overall U. S. food and fiber production must increase some 20 percent over 1960 in order to feed the 230,000,000 U. S. population expected in that year. To meet these needs, USDA anticipates that crop production will have to go up 14 percent and livestock production up 40

percent. These needs can be met on current acreages, say USDA scientists, by increasing production efficiency.

Experiment Station Administrator

Directors of Agricultural Experiment Stations are openly pleased by Agriculture Secretary Orville Freeman's move to set up an independent service within USDA for Experiment Stations.

Until now, USDA relations with Experiment Stations have been directed by a Deputy Administration of ARS. Now, Experiment Stations will have an Administrator of their own. Besides greater prestige, they hope the move will open the doors to higher federal appropriations for their agricultural research works.

While the new Administrator for Experiment Stations will report directly to an Assistant Secretary of Agriculture, all of the cooperative Experiment Station research will be under the over-view of ARS Administrator Dr. Byron Shaw.

Dr. Shaw has been given the responsibility for coordinating all research of USDA — marketing, economic research, and cooperative Experiment Station research, as well as ARS. Overall, the changes are expected to increase the total of agricultural research and thus work to speed agricultural progress.

Public Relations

Several of the agricultural chemical industry's most irritating public relations problems now appear to be well on the way to solution. One evidence is the agreement between USDA and the Federal Food and Drug Administra-

(Continued on Page 148)

call for -

DUVAL

when you want -

SERVICE and QUALITY

We welcome urgent orders—ship them the same day, when they are received by early afternoon. Constant research, development, and control assure you of the highest quality in potash and sulphur.



- MURIATE OF POTASH
 standard and granular types
- SULPHUR lump and molten

DUVAL SULPHUR &

Exclusive Sales Agent

ASHCRAFT-WILKINSON CO.
ATLANTA, GEORGIA

Norfolk, Va. . Charleston, S. C. . Tampa, Fla. . Jackson, Miss. . Columbus, Ohio . Montgomery, Ala. . Des Moines, Iowa

1961-1962

Buyer's Guide

for the Agricultural Chemicals Industry

ADJUVANTS, SPRAY—See Sprayers-Stickers, Wetting Agents, Solvents, Emulsifiers

AMMONIATOR-GRANULATORS

Atlanta Utility Works
East Point, Ga.

Blue Valley Equip. Mig. Eng'g. Co. Topeka, Kans.

Davidson Kennedy Co. Box 97, Station D, Atlanta, Ga.

Dorr-Oliver Inc. Stamford, Conn.

Dravo Corp.
Neville Island, Pittsburgh
(pan granulators)

Fertilizer Engineering & Equip. Co. Sturgeon Bay Road, Green Bay, Wisc. (pan granulators)

Link Belt Co. Prudential Plaza, Chicago 1

Manitowoc Shipbuilding Inc. Manitowoc, Wis.

McDermott Bros. Washington & 3rd, Allentown, Pa.

Edw. Renneburg & Sons Co. 2639 Boston St., Baltimore 24

A. J. Sackett & Sons 1337 S. Highland Ave., Baltimore

Stedman Foundry & Machine Co.

Sturtevant Mill Co. 123 Clayton St., Boston 22

Worthington Corp. Harrison, New Jersey

AMMONIUM SULFATE — See Nitrogen Materials (Solid)

ANIMAL FEED SUPPLEMENTS

American Cyanamid Co. Princeton, N. J.

E. I. du Pont de Nemours & Co. Wilmington, Del.

Eastman Chemical Products, Inc. Kingsport, Tenn.

Hooker Chemical Corp.
Phosphorus Div.
Jeffersonville, Ind.

Intl. Minerals & Chemical Corp. Skokie. Ill.

Shepard Div. of South American Minerals & Merchandising Corp. 425 Park Ave., New York 22 (Copper compounds)

U.S. Industrial Chemicals Co. 99 Park Ave., New York 16

ANTI-CAKING AGENTS—See Conditioners (Fertilizer)

APPLICATION EQUIPMENT and SUPPLIES—See Pgs. 96-98

ARSENATES—See Insecticides

ATTRACTANTS-See Baits

BHC—See Insecticides

BAG PACKING, WEIGHING AND CLOSING MACHINERY

Bagpak Div., Int'l Paper Co. 220 E. 42nd St., New York 16

Black Products Co. 13513 S. Calumet Ave., Chicago 27

Bemis Bro. Bag Co. 408 Pine St., St. Louis 2

BIF Industries 536 Harris Ave., Providence 1, R. I.

Bag Closing Machinery

For automatic, square or flat paper bags

GEORGE H. FRY COMPANY 42 East 2nd St., Mineola, N. Y.

See advertisement on Page 111

Burrows Equipment Co.
1316-AC Sherman Ave., Evanston, Ill.

Coddington Mig. Co. 5024 N. 37 St., Milwaukee 9, Wisc.

Exact Weight Scale Co. Columbus, O.

Dave Fischbein Co. 38 Glenwood Ave., Minneapolis

George H. Fry Co. 42 E. 2nd St., Mineola, N. Y.

Inglett & Co., Inc. P. O. Box 3425, Augusta, Ga.

Inglett Dev. & Engineering Assoc. P. O. Box 177, Augusta, Ga.

Kraft Bag Div., St. Marys Kraft Corp.

subsidiary of Gilman Paper Co.

Lowndes Engineering Corp., Valdosta, Ga.

Minneapolis Sewing Machine Co. Minneapolis, Minn.

Packaging Machinery Div., FMC Stokes & Smith Plant 4900 Summerdale Ave., Philadelphia 24

Raymond Bag Corp. Middletown, O.

Richardson Scale Co. Clifton, N. J.

Stoker Co., H. L.
111 S. College Ave., Claremont, Calif.

St. Regis Paper Co. 150 E. 42nd St., N. Y. 17

Thayer Scale Corp. Pembroke, Mass.

Union Bag-Camp Paper Corp. 233 Broadway, N. Y. 17

Union Special Machine Co. 447 N. Franklin St., Chicago 10

BAGS (Cloth)

Bemis Bro. Bag Co. 408 Pine St., St. Louis, 2

Chase Bag Co.
355 Lexington Ave., New York 17

EXPANDA-KRAFT BAGS

Multiwall bags made of Expanda-Kraft: reduce breakage, stack securely, withstand moisture, print sharp, fill fast.

Hollingsworth & Whitney Div. of

SCOTT PAPER COMPANY Chester, Pennsylvania

See advertisement on Page 134

Mente Bag Co. 2811 Touro, New Orleans

Percy Kent Bag Co. 715 Armour Rd., N. Kansas City, Mo.

Premium Bag Co. 5353 Boston St., Baltimore 24

Werthan Bag Corp. 1400 8th Ave., N. Nashville, Tenn.

BAGS (Multiwall)

Albermarle Paper Mig. Co. P. O. Box 2189, Richmond 17

Ames Harris Neville Co. 2600 84th St., Berkeley 10, Calif.

Arkell Safety Bag Co. 6345 W. 65th St., Chicago 38

Bagpak, Div., Int'l. Paper Co. 220 E. 42nd St., N. Y.

Bemis Bro. Bag Co. 601 S. 4th St., St. Louis

Chase Bag Co. 355 Lexington Ave., New York 17

Crown Zellerbach Corp. 231 Sansome St., San Francisco

Continental Can Co. 100 E. 42nd St., N. Y. 17

Equitable Paper Bag Co. 45-50 Van Dam St., Long Island, N. Y.

Hudson Pulp & Paper Co. 477 Madison Ave., N. Y.

Hollingsworth & Whitney
Div. of Scott Paper Co.,
230 Park Ave., N. Y. 17

Kennedy Car Liner & Bag Co. Shelbyville, Ind.

Kraft Bag Div., St. Marys Kraft Corp.

subsidiary of Gilman Paper Co. 111 W. 50th St., New York 20

Olin Mathieson Packaging Div. W. Monroe, La.

Owens Illinois Glass Co. Toledo 1, Ohio

Percy Kent Bag Co. 5910 Vinner Blvd., Kansas City, Mo.

Raymond Bag Corp. Middletown, Ohio

KRAFTPACKER

Kraft's newest open mouth bag filling machine also

Kraft Multiwall Bags

The KRAFT BAG Div.

St. Marys Kraft Corp., Subsidiary of GILMAN PAPER COMPANY

111 West 50th St., New York 20, N. Y. See advertisement on Page 29

St. Regis Paper Co. 50 E. 42nd St., N. Y. 17

Union Bag-Camp Paper Corp. 233 Broadway, N. Y.

West Virginia Pulp & Paper Co. 230 Park Ave., N. Y. 17

BAGS (Paper, lined and unlined)

American Bag & Paper Corp. Philadelphia, Pa.

Bagpak Div., Int'l. Paper Co. 220 E. 42nd St., N. Y. 17

Bemis Bro. Bag Co. 408 Pine St., St. Louis, 2

Brown Co. 150 Causeway St., Boston 14

Chase Bag Co. 355 Lexington Ave., New York 17

Chippewa Plastics Chippewa Falls, Wis.

Continental Can Co. Flexible Packaging Div., Devon, Pa.

Crown Zellerbach Corp. 231 Sensome St., San Francisco

Kraft Bag Div., St. Marys Kraft Corp.

subsidiary of Gilman Paper Co. 111 W. 50th St., New York 20

Raymond Bag Corp. Middletown, Ohio

St. Regis Paper Co. 50 E. 42nd St., New York 17

Union Bag-Camp Paper Corp. 233 Bway, New York

West Virginia Pulp & Paper Corp. 230 Park Ave., N. Y. 17

BAGGING - Thread

Bemis Bro. Bag Co. 408 Pine St., St. Louis, 2 (Acid resistant thread)

Chase Bag Co. 355 Lexington Ave., New York 17

E. I. du Pont de Nemours & Co. Textile Fiber Dept. Wilmington, Del.

Bemis

MULTIWALL BAGS

"Grab the Tab and Bemi Strip"

BEMIS BRO. BAG CO.

408 Pine St., St. Louis

See advertisement on Page 104

BAITS and ATTRACTANTS (To be combined with pesticides in the formulation of finished insecticide baits)

Givaudan-Delawanna, Inc. 321 W. 44th St., New York 36 (Methyl Eugenol)

Nutritional Biochemicals Co. 21010 Miles Ave., Cleveland (Yeast Hydrolysate)

A. E. Staley Mig. Co. Decatur, Ill. ("P.I.B." Protein Insecticide Baits)

Marvin R. Thompson
44 June Road, Stamford, Conn.

BARREL LINERS

Arkell Safety Bag Co. 6345 W. 65 St., Chicago 38, Ill.

Bemis Bro. Bag Co. 408 Pine St., St. Louis 2

Chase Bag Co.

355 Lexington Ave., New York 17

KVP Sutherland Paper Co., KVP Division Kalamazoo, Michigan

Donald Palmer, Inc. 2627 Tchoupitoulas St., New Orleans

BATCHING EQUIPMENT

Inglett Dev. & Engineering Assoc. P. O. Box 177, Augusta, Ga.

Stedman Foundry & Machine Co., Inc.

Aurora, Indiana

BHC — See Insecticides

IDEA

Batch Weigh Systems
Bag Filling, Loading Systems
Bulk Material Loading
Mixing Equipment
Materials Handling Equipment

INGLETT Development and Engineering Associates

O. Box 177 Augusta, Ga.

See advertisement on Page 7

BIN INDICATING DEVICE

Bin-Dicator Co. 13946 Kercheval, Detroit 15, Mich.

Convair Pittsburgh 26, Pa

BIN VIBRATOR

Cleveland Vibrator Co. 2828 Clinton St., Cleveland, Ohio

Gerotor May Corp. Owings Mills, Md.

Syntron Co. 579 Lexington Ave., Homer City, Pa.

Vibra-Screen Feeders, Inc. Clifton, N. J.

BLENDERS - See Mixers

BONE MEAL

Amer. Agricultural Chemical Co. 100 Church St., New York 7

Baugh Chemical Co. 25 S. Calvert St., Baltimore, Md.

Consolidated Chemical Industries 6910 Fannin St., Houston, Texas

Darling & Co. 4101 S. Ashland Ave., Chicago 9

Faesy & Besthoff, Inc. 25 E. 26th St., New York 10

Van Iderstine Co. 37030 Riview Ave., L. I. C., N. Y.

BORATES

Amer. Potash & Chem. Corp. 3000 W. 6th St., Los Angeles 54

Stauffer Chemical Co. 380 Madison, New York 17

U. S. Borax 630 Shatto Pl., Los Angeles 5

BUCKETS

Blaw Knox Co. 300 6th Ave., Pittsburgh 22

Inglett & Co. Augusta, Ga.

C. S. Johnson Co Champaign, Ill.

Webster Mig. Co. Tiffin, Ohio

CALCIUM ARSENATE — See Insecticides

CORRUGATED — See Packaging Materials

CARTONERS and CARTON PACKERS—See also Packaging Materials

Burt Machine Co. 401 E. Oliver Street, Baltimore 2. Md.

Chisholm-Ryder Co. of Pennsylvania Blettner Avenue, Hanover, Pa. Clybourn Machine Corp. 6479 N. Avondale, Chicago 31, 111.

J. L. Ferguson Co. Route 52, Joliet 3, Ill.

FMC Packaging Machinery Div. Stokes & Smith Plant 4988 Summerdale Ave., Phila., Pa.

R. A. Jones & Co. P. O. Box 485, Cincinnati, O.

National Equipment Corp. 153-7 Crosby Street, New York, N. Y.

Pneumatic Scale Corp.
65 Newport Ave., North Quincy 71,
Mass.

Standard-Knapp Div., Emhart Mig. Co Portland, Conn.

Triangle Package Machinery Co. 6633 West Diversey Blvd., Chicago, Ill.

CATTLE DIPS AND SPRAYS

Agricultural Specialties 12200 Denton Dr., Dallas, Tex.

Chemical Service of Baltimore Howard & West St., Baltimore, Md.

Chipman Chemical Co. Bound Brook, N. J.

Eagle Soap Co. Huntington, Ind.

Haag Laboratories, Inc. 140th & Seeley, Blue Island, Ill.

Higley Chem. Co. Dubuque, Iowa

R. M. Hollingshead Corp. Camden, N. J.

Hysan Prods. Co. 936 W. 38th Place, Chicago

Ortho Div., California Chemical Co. Richmond, Va.

Peck's Prod. Co. 610 E. Clarence Ave., St. Louis

Rex Research Corp. Toledo, Ohio

Standard Oil Co. (Ohio) Midland Bldg., Cleveland

Thompson-Hayward Chemical Co. 2915 Southwest Blv., Kansas City, Mo.

James Varley & Sons 1200 Switzer Ave., St. Louis

CATTLE GRUB CONTROL PREP-ARATIONS

Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va.

Dow Chemical Co. Midland, Mich. (Trolene)

CHELATING AGENTS

Dow Chemical Co. Midland, Mich. (Versenes)

Faesy & Besthoff, Inc. 25 East 26th St., New York 10 (F&B Nutritional Iron)

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y. (Sequestrenes)

Hampshire Chemical Corp. Poisson Ave., Nashua, N. H.

Refined Products Corp. 624 Schuyler, Lyndhurst, N. J. (Perma Green)

CHLORDANE — See Insecticides

CLASSIFIERS

Buell Engineering Co. 123 Williams St., New York

Service Engineering Co. Box 2035, N. W. Sta., Davenport, Iowa

Simplicity Engineering Co. Durant, Michigan

CLOTHING, PROTECTIVE (gloves aprons, guards, etc.) see also Masks

Acme Protection Equipment Co. 1201 Kalamazoo St., S. Haven, Mich.

American Optical Co. Mechanics St., Southbridge, Mass.

Charleston Rubber Co. 21 Stark Ind. Park, Charleston, S. C. (Gloves)

Disposables, Inc. 11 Mercer St., New York 13 (Disposable Paper Work Clothes)

Hub States Chemicals & Equipment 1255 Windsor St., Indianapolis 1, Ind.

Jomac-North, Inc. Warsaw, Ind.

Mine Safety Appliances Co. 201 N. Braddock Ave., Pittsburgh 8

Singer Glove Mig. Co. 860 W. Weed St., Chicago 22 (Disposable Paper Clothing)

CONDITIONERS (Fertilizer)

Aquafil Co. 321 State St., Los Altos, Calif.

Armour Industrial Chem. Co. 110 N. Wacker Dr., Chicago 6, Ill.

Dicalite Dept. Great Lakes Carbon Corp. 612 S. Flower St., Los Angeles 17 (Dicalite)

Eagle Picher Co. Central Pkway & Walnut St., Cinn. (Celatom)

J. M. Huber Corp. 630 Third Ave., New York 17

Intl. Commodities Corp.
11 Mercer St., New York 13

Johns Manville Corp. 22 E. 40th St., N. Y. 16 (Celite)

CAL-MAG OXIDES

Superior dehydrating, neutralizing, and curing factors in the preparation of better fertilizers.

And STONE CO.

Findlay, Ohio

See advertisement on Page 138

CONDITIONERS (Contd.)

Kenite Corp.
Overhill Bldg., Scarsdale, N. Y.
(Kenite 51, Kenite AC)

Minco Products Co. Box 367, Saginaw, Mich.

Minerals & Chemicals Philipp Co. 743 Essex Turnpike, Menlo Park, N. J. (Attacote)

Moores Lime Co. Springfield, Ohio (Doloxide)

National Lime & Stone Co. Findlay, Ohio (Cal magoxides)

National Aniline Div., Allied Chem. Corp. 40 Rector St., New York

Petrochemicals Co. Long Beach, Calif. (Petro AG)

Quaker Oats Co., Chemicals Div. Merchandise Mart, Chicago 54, Ill. (Fur-Ag)

Star Enterprises, Inc. 212 York St., Cassopolis, Mich. (Creek-o-Nite)

Southeastern Clay Co. P. O. Box 1022; Aiken, S. C. (Kaocote)

Stepan Chemical Co. Edens & Winnetka, Northfield, Ill.

Thomas Alabama Kaolin Co. 2412 Ken Oek Rd., Baltimore 9, Md. (Tako)

Ultra Chemical Works
Piv. of Witco Chemical Co.
Pair son 4, N. J.
(Sulframin)

U. S. Graphte Co. Saginaw 17, Mich.

Zonolite Co. 135 LaSalle St., Chicago 3 (Terralite)

CONSULTANTS AND RESEARCH AGENCIES

Agricultural Aviation Eng'g. Co. 858 Scott St., Santa Clara, Calif. (Aerial)

Agri Research Inc. Manhattan, Kansas

DIATOMITE

for free-flowing, non-caking fertilizers

KENITE CORPORATION
Overhill Bldg., Scarsdale, N. Y.

See advertisement on Page 119

A. Edison Badertscher
1113 N. Rolling Rd., Baltimore 28
(labeling, compounding)

Battelle Memorial Institute 505 King Ave., Columbus, Ohio

Bio-Search & Development Co. 12700 Prospect, Rt. #1, Grandview, Mo. (Research and Development)

Alvin J. Cox. Ph.D. 118 Emerson Street, Palo Atlo, Calif.

Doane Agricultural Service 5142 Delman Blvd., St. Louis (marketing studies)

Edwards Laboratory Norwalk, Ohio (Soil Testing Service)

Evans Research and Development Corp. 250 E. 43rd St., New York 17 (Product Development. Evaluation)

Florida Field Trials
Dr. G. R. Townsend, Belle Glade, Fla.
(Field Trials, Chemical Evaluation)

Food & Drug Research Laboratories Inc. Maurice at 58th St., Maspeth 58, N. Y. (Toxicological and Inhalation Studies)

Harris Laboratories, Inc. 816 "P" St., Lincoln 8, Neb. (Field Triels, Toxicology, Research)

Hazleton Laboratories
Falls Church, Va.
(Inhalation Studies, Toxicity Tests)

Hill Top Research Institute, Inc. Miamiville, Ohio (Toxicity, Irritation Tests)

Leberco Laboratories 123 Hawthorne St., Roselle Park, N. J. (Toxicity, Irritation Studies)

Dr. Emery D. Robert 3121 N. Sheridan Rd., Chicago, 14 (Market Surveys, Technical Research and Development)

Rosner-Hixon Laboratories 7737 S. Chicago Ave., Chicago, 19 (Toxicity, Irritation Studies)

Dr. Roger W. Roth 2247 Silverpine Dr., Glenview, Inc.

Vincent Sauchelli 303 Overhill Road, Baltimore, Md. (Fertilizers — Pesticides, Market Research, Plant Production)

CONSULTANTS

Laboratory Services

WISCONSIN ALUMNI RESEARCH FOUNDATION

PO Box 2217, Madison, Wisc.

See advertisement on Page 137

Scientific Associates 3755 Forest Park Ave., St. Louis 8, Mo. (Animal Studies, Toxicity and Bacteriological Testing)

Foster D. Snell. Inc. 29 West 15th St., New York 11 (Research Testing and Development)

Sperling Laboratories 6815 N. 24th Street, Arlington, Va. (Research, Testing, Toxicity)

Theodore Riedeburg Associates 415 Lexington Ave., New York, 17 (Testing, Marketing)

United States Testing Co. 1415 Park Ave., Hoboken, N. J. (Research, Testing, Toxicology)

Wisconsin Alumni Research
Foundation
P. O. Box 2217-DD, Madison 1, Wis.
(Formulation, Labeling, Testing)

Wolf's Agricultural Laboratories 2620 Taylor St., Hollywood, Fla. (Testing, Chemicals Evaluation)

ages of pesticides, fertilizers, etc.) — See also Pails

Bradley Container Corp.
Thompson St., Maynard, Mass.

Cleveland Container Co. 6201 Barberton Ave., Cleveland 2

Continental Can Co.

Boxboard and Folding Carton Div.

530 Fifth Ave., N. Y. 36

Harcord Mig. Co. 125 Monitor St., Jersey City, N. J.

R. C. Can Co. 9430 Page Blvd., St. Louis 14

Stone Container Corp. 4200 W. 42nd Place, Chicago 32

CONVEYORS

Atlanta Utility Works
East Point, Ga.

Barber Green Co., (belt conveyor) Aurora, Ill.

Bonded Scale & Machine Co. 2176 S. 3rd St., Columbus 7, Ohio

Carrier Conveyor Corp. 206-A No. Jackson St., Louisville, Ky.

Chantland Mig. Co. Humboldt, Iowa

DDT Fertilizer Custom Grinding

LEBANON CHEMICAL CORP.

P. O. Box 532, Lebanon, Pa.

See advertisement on Page 115

Cleveland Vibrator Co. 2828 Clinton Ave., West Cleveland 13, Ohio

J. B. Ehrsam & Sons Enterprise, Kansas

Farquhar Div., (belt conveyor) York, Pa.

Fertilizer Engineering & Equip. Co., Inc. Sturgeon Bay Road, Green Bay, Wisc.

Finco Inc.
Aurora, Ill.
(Portable Belt Conveyors)

Fuller Co. (pneumatic conveyors) Catasauqua, Pa.

Inglett & Co. P. O. Box 3425, Augusta, Ga.

Inglett Dev. & Engineering Assoc. P. O. Box 177, Augusta, Ga.

Jeffrey Mfg. Co. E. First Ave. & 4th St., Columbus 16, Joy Manufacturing Co. (belt conveyor) 401 Oliver Bldg., Pittsburgh

Kennedy-Van Saun Manufacturing & Engineering Corp. 405 Park Ave., New York 22 (pneumatic conveyor)

C. S. Johnson Co. Champaign, Ill.

Link Belt Co. Prudential Plaza, Chicago 1

Power-Curv Conveyor Co. 2185 S. Jason St., Denver 23

Edw. Renneburg & Sons Co. 2639 Boston St., Baltimore 24

K. E. Savage Co. (bag conveyor) 823 W. 21 St., Norfolk 10, Va.

Standard Prod. Div. Adamson Mig. Co. 421 Ridgeway Ave., Aurora, Ill.

FORMULATORS PACKERS DISTRIBUTORS

of

Insecticides • Fungicides
Fertilizers

FAESY & BESTHOFF, INC. 26 East 26th St., New York 10

See advertisement on Page 143

Sturtevant Mill Co.

123 Clayton St., Boston 22

Schaffer Poidometer Co. 2628 Smallman St., Pittsburgh 22

Stedman Foundry & Machine Co. Aurora, Illinois

Universal Hoist Co.

1326 Waterloo Rd., Cedar Falls, Iowa

COOLERS - See Dryers

COPPER OXIDE — See Trace Elements

COPPER SULFATE — See also Fungicides

Faesy & Besthoff, Inc. 25 E. 26 St., New York 10, N. Y.

Intl. Commodities Corp.
11 Mercer St., New York 13

Phelps Dodge Refining Corp. 300 Park Ave., New York 22

Republic Chemical Corp. 94 Beekman St., New York 38

Tennessee Corp. 617 Grant Bldg., Atlanta

CRUSHERS — See Mills

CRYOLITE

Aluminum Co. of America Pittsburgh, Pa.

Harshaw Chemical Co. 1945 E. 97th St., Cleveland 6

Pennsalt Chemicals Corp. Tacoma, Wash

United Chemetrics 600 S. 4th St., Richmond 4, Calif. **CUBE** — See Insecticides

CUSTOM GRINDING

Corona Chemical Co.
Div. of Pitt. Plate Glass Co.
Moorestown, N. J.

Fluid Energy Processing & Equipment Co. Richmond & Norris Sts., Phila. 25

Richmond & Norths Sta., Finia

Lebanon Chemical Corp. P. O. Box 532, Lebanon, Pa.

CUSTOM PACKAGING (finished products for resale under private brand)

Davies Nitrate Co. 118 Liberty St., New York 6 (Fertilizers)

Faesy & Besthoff 26 E. 26th St., New York 10

Lebanon Chemical Corp. P. O. Box 532, Lebanon, Pa.

Plant Food Corp. 3711 Medford St., Los Angeles, 63 Private Brands, Inc.

Private Brands, Inc. 300 S. 3rd St., Kansas City 18, Kans.

DDT — See Insecticides

DEALERS and DISTRIBUTORS (Chemicals)

American-British Chem. Supplies 180 Madison Ave., N. Y.

Amsco Solvents & Chemicals Co. 4619 Reading Road, Cincinnati 29, O.

H. J. Baker & Bro. 733 3rd Ave., New York 17

Barada & Page Kansas City, Mo.

Berkshire Chemicals, Inc. 630 Third Ave., New York 17

Bradley & Baker 155 E. 44th St., New York

John H. Calo Co.

19 Rector St., N. Y. 6

T. G. Cooper & Co. Cedar & Venango Sts., Phila. 34 Dickerson Co.

Dickerson Co.
Drexel Bldg., Phila.

Eastern Industries Ridgefield, N. J.

Faesy & Besthoff 25 E. 26th St., N. Y. 10

Micronized Tri-Basic

COPPER SULPHATE

contains 53% copper as metallic

TENNESSEE CORPORATION 612-629 Grant Building Atlanta 3, Ga.

See advertisement on Page 51

TRIANGLE BRAND COPPER SULFATE

To produce more profitable crops

PHELPS DODGE REFINING CORP.

300 Park Ave., New York 22

See advertisement on Page 57



DEALERS and DISTRIBUTORS (Chemicals) (Contd.)

Alex C. Fergusson Co. Drexel Bldg., Phila.

Fort Pitt Chemical Co. 3134 Penn Ave., Pittsburgh

Gaylord Chem. Co. 420 E. 44th St., Kansas City 10, Mo.

Globe Chemical Co. Murray Road, Cincinnati

Hummel Chemical Co. 90 West St., N. Y.

Innis Speiden & Co. 630 Third Ave., New York 17

Merchants Chemical Co. 60 E. 42nd St., N. Y.

Millmaster Chem. Corp. 295 Madison Ave., N. Y.

Missouri Solvents & Chemicals Co. 419 De Soto Ave., St. Louis 7, Mo.

Ohio Solvents & Chemicals Co. 3470 W. 140th St., Cleveland 11, Ohio

Philipp Bros. N. Y. Coliseum, New York

Prior Chem. Corp. 420 Lexington Ave., N. Y. 17

G. S. Robins & Co. 126 Chouteau Ave., St. Louis

Robeco Chemicals, Inc. 25 E. 26th St., N. Y.

Southern Solv, & Chem. Corp. Jefferson Highway, New Orleans

Texas Solvents & Chemicals Co. 8501 Market St., Houston

Thompson-Hayward Co. Box 768, Kansas City 8, Mo.

Toledo Sols. & Chems. Co. 4051 South Ave., Toledo, O.

Chas. A. Wagner Co. 4455 N. 6th St., Phila.

Wisconsin Solvents & Chemicals Corp. 1719 S. 83rd St., Milwaukee

Woodward & Dickerson, Inc. 1400 S. Penn Square. Philadelphia 2

FERTILIZER and FEED MATERIALS

POTASH NITROGEN

WOODWARD & DICKERSON 1400 S. Penn Square, Phila. 2, Pa.

See advertisement on Page 8

DEFOLIANTS — See Herbicides

DETERGENTS FOR FRUIT WASHING

National Aniline Div., Allied Chem. Corp. 40 Rector St., New York

Antara Chemicals 435 Hudson St., New York

Cowles Chemical Co. 12,000 Shaker Blvd., Cleveland 20

Colgate Palmolive Co. 300 Park Ave., New York, 22

Diamond Alkali Co.
Union Commerce Bldg., Cleveland

Diversey Corp. 1820 W. Roscoe St., Chicago

DuBois Co. Cincinnati, Ohio

Essential Chemicals Co. 5906 N. Port Washington Rd., Milw.

National Milling & Chemical Co. 4501 Flat Rock Rd., Philadelphia

Nopco Chemical Co. 60 Park Pl., Newark 1, N. Y.

Oronite Chemical Co. 200 Bush St., San Francisco 20

Procter & Gamble Distributing Co. Cincinnati, Ohio

Solvay Process Div. 61 Broadway, New York

John T. Stanley Co. 642 W. 30th St., New York

Stepan Chemical Co.
Edens & Winnetka, Northfield, Ill.

Swift & Co. Chicago

Ultra Chemical Works 2 Wood St., Paterson, N. J.

Virginia-Carolina Chemical Corp. 501 East Main St., Richmond, Va.

Westvaco Mineral Prods. Div. 161 E. 42nd St., New York 17

Witco Chemical Co. 122 E. 42nd St., New York 17

Wyandotte Chemicals Corp. Wyandotte, Mich.

DIAZINON — See Insecticides

DIELDRIN — See Insecticides

DIETHYL TOLUAMIDE — See Repellents

DILUENTS, CARRIERS & EXTENDERS

Aquafil Co. Box 94, Los Altes, Calif.

American Talc Co. (Clatyl) Chatsworth, Ga.

American Vermiculite Corp. 527 Madison Ave., New York 22

Bell Clay Co. Gleason, Tenn.

Godfrey L. Cabot, Inc. 125 High St., Boston 10, Mass.

Calcium Carbonate Co. 520 S. 4th St., Quincy, Ill. (CCC Diluent)

California Industrial Minerals Co. Friant, Calif. (Frianite)

Carbola Chemical Co. Natural Bridge, N. Y.

Cohutta Talc Co. (Talc) Dalton, Ga.

Commercial Minerals Co. 310 Irwin St., San Francisco (calcium carbonate, soapstone)

Dicalite Dept. Great Lakes Carbon Corp. 612 S. Flower St., Los Angeles (Dicalite)

Eagle-Picher Co. (Celatom) 900 American Bldg., Cincinnati, 1

Eastern Magnesia Talc Co. (Emtco) 206 Bank St., Burlington, Vt.

Floridin Co. (Diluex, Florex)
Tallahassee, Fla.

General Minerals Co. (formerly Carolina Pyrophyllite Co.) 1104 E. Wendover Ave., Greensboro, N. C.

General Reduction Co. (Pikes Peak) 1820 Roscoe St., Chicago, 13

Georgia Kaolin Co.
511 Westminster Ave., Elizabeth, N. J.

Glendon Insecticide Grade

PYROPHYLLITE

diluent and exiender

GENERAL MINERALS CO.

(formerly Carolina Pyrophyllite Co.) 1104 E. Wendover Ave. Greensboro, N. C.

See advertisement on Page 113

BARDEN CLAY

carrier — diluent

J. M. HUBER CORP. 630 Third Avenue New York 17, New York

CELITE

diatomite fillers

JOHNS-MANVILLE

Box 325 New York 16, N. Y.

New 101k 10, 14. 1.

See advertisement on Page 130

Georgia Talc Co. Chatsworth, Ga.

Huber, J. M., Corp., (Barden, Suprex) 630 Third Ave., New York, 17

Industrial Minerals & Chemical Co. 6th & Gilman Sts., Berkeley, Calif. (Soapstone, B56)

Intl. Commodities Corp.
11 Mercer St., New York 13

Johns-Manville Products Corp. 22 East 40th St., New York, 16 (Micro-Cel, Celite)

Kenite Corp.
Overhill Bldg., Scarsdale, N. Y.
(Kenite 75)

Kennedy Minerals Co. 2550 E. Olympic Blvd., Los Angeles 23

W. H. Loomis Talc Corp. Gouverneur, N. Y.

Magnet Cove Barium Corp.
PO Box 6504, Houston 5, Tex.
(Carriclay, Pulgite, Arrowhead)

Mill White Clay Co. Attapulgus, Ga.

Minerals & Chemicals Philipp Corp.

Menlo Park, N. J. (Attaclay)

Minco Products Corp. PO Box 367, Saginaw, Mich.

National Kaolin Products Co. Aiken, S. C.

Ohio Lime Company Woodville, Ohio (Stonelite)

TYPE-41

kaolin clay

SOUTHEASTERN CLAY COMPANY

Aiken, S. C.

See advertisement on Page 147

GRANULEX

for granulated pesticides

MAGNET COVE BARIUM CORP.

PO Box 6504, Houston, Tex.

See advertisement on Page 120

Quaker Oats Co., Chemicals Div. Merchandise Mart, Chicago 54

Southeastern Clay Co. P.O. Box 1022, Aiken, S. C. (type 41 clay)

A. E. Staley Mig. Co. (Lo-Fat Soy Flour) Decatur, Ill.

Star Enterprises, Inc. 212 York St., Cassopolis, Mich. (Creek-O-Nite)

Summit Industries, Inc. Aspers, Adams Cty., Pa. (Ser-X)

Tamms Industries, Inc. 228 N. LaSalle St., Chicago, 1

Thomas Alabama Kaolin Co. 2412 Ken Oak Rd., Baltimore 9, Md. (Tako)

United Clay Mines Corp. Trenton 6, N. J. (Dilex, Barnett, Franklin)

United Chemetrics 600 S. 4th St., Richmond, Calif. (Silikil)

Vanderbilt Co., R. T. 230 Park Ave., New York, 17 (Pyrax, Continental)

Whittaker, Clark & Daniels, Inc. 100 Church St., New York 7

Zonolite Co. 1827 Benson St., Evanston, Ill. (Terralite)

DISINFECTANTS, SEED — See Fungicides

DISPERSANTS — See spreadersstickers

TAKO

colloidal kaolinitic kaolin carrier — diluent

The Thomas Alabama Kaolin Co.

> 2412 Ken Oak Road Baltimore 9, Maryland

See advertisement on Page 148

Atttacote

Fertilizer Conditioner

Attaclay
 Pesticide Carrier

Attagel
 Suspending Agent

MINERALS & CHEMICALS PHILIPP CORP.

743 Essex Turnpike Menlo Park, New Jersey

See advertisement on Pages 10, 11

DRUMS (Fibre)

Bennett Industries 122 N. Washington St., Peotone, Ill.

Benson Fibre Drum Co. 186 Van Dyk St., Bklyn.

Buffalo-Carpenter Container Corp. P. O. Box 518, Niagara Falls, N. Y.

Continental Can Co. 100 E. 42nd St., N. Y. 17

Emery-Carpenter Container Co. Carew Tower, Cincinnati

Federal Fibre Corp. 3704 10th St., L. I. C., N. Y.

Fibre Drum Co. 20 N. Wacker Dr., Chicago 6

Master Package Corp. Owen, Wisc.

Monmouth Container Corp. Matawan, N. J.

Rheem Mig. Co. 1701 Edgar Rd., W., Linden, N. J.

Seymour & Peck Co. Blue Island, Ill.

Virginia Barrel Co. P. O. Box 86, Staten Island, N. Y.

DRUMS (Metal)

Bennett Industries 122 N. Washington St., Peotone, Ill.

Continental Can Co. 100 E. 42nd St. N. Y. 17

Delaware Barrel & Drum Co. Wilmington, Del.

Eastern Steel Barrel Corp. 3021 Lincoln Blvd., Bound Brook, N. J.

DILUENTS

Pyrax ABB
Darvan No. 1 & No. 2
Continental® Clay

R. T. VANDERBILT COMPANY 230 Park Avenue

New York 17, New York

DRUMS (Metal) (Contd.)

Florida Drum Co. 208 E. Liberty St., Pensacola. Fla.

Geuder, Paeschke & Frey Co. 324 N. 15 St., Milwaukee

Inland Steel Container Co. 30 W. Monroe, Chicago

Jones & Laughlin Steel Corp. 3 Gateway Center, Pittsburgh

Manion Steel Barrel Co. Rouseville, Pa.

Myers Drum Co. 6549 San Pablo Ave., Oakland, Calif.

National Steel Container Corp. Chicago 38

Newark Steel Drum Co. Linden, N. J.

Ohio Corrugating Co. Warren, O.

Rieke Metals Products Corp. Auburn, Indiana

Reliable Steel Drum Co. 808 Union Ave., Bridgeport, Conn.

Republic Steel Corp.
Republic Bldg., Cleveland 1

Rheem Mig. Co. 1701 Edgar Rd., W., Linden, N. J.

Southern States Containers 2830 5th Ave., North, Birmingham, Ala.

Specialty Machinery Corp. 50 Rosnoke Ave., Newark 5, N. J. (drum handler)

U. S. Steel Prods. Co. 30 Rockeleller Plaza, N. Y. 20

United States Barrel Co. 225 S. 15th St., Phila. 2

Virginia Barrel Co. P.O. Box 86, Staten Island, N. Y.

Vulvan Containers, Inc. Bellwood, Ill.

Vulcan Steel Container Co. 3315 N. 35th Ave., Birmingham, Alc.

DRYERS - COOLERS

Davidson-Kennedy Co. Box 97, Station D, Atlanta

Fertilizer Engineering & Equipment Co Sturgeon Bay Rd., Rt. 1, Green Bay, Wisc.

General American Transportation Corp. 135 LaSalle St., Chicago

Hardinge Co. York, Pa.

Kennedy-Van Saun Mig. & Engr. Corp.

405 Park Ave., N. Y. 22

Link Belt Co.
Prudential Plaza, Chicago 1
McDermott Bro. Co.

Washington & 3rd, Allentown, Pa. Edw. Renneburg & Sons Co. 2639 Boston St., Baltimore 24

A. J. Sackett & Sons 1737 S. Highland Ave., Baltimore, Md

Standard Steel Corp.
P. O. Box 58252, Los Angeles 58

Air Pollution Control DUST COLLECTOR

Multi-Wash collects odors, fumes and dusts efficiently and economically

CLAUDE B. SCHNEIBLE CO. 2827 25th Street Detroit 32, Michigan

See advertisement on Page 114

DUST COLLECTORS

BIF Industries, Inc. 536 Harris Ave., Providence 1, R. I.

Buell Engineering Corp. 123 William St., New York 38

Day Co. 810 3rd Ave. N. E., Minneapolis

Davidson Kennedy Co. Box 97, Station D. Atlanta

Dustex Corp. 1758 Waldemere St., Buffalo, N. Y.

Fertilizer Engineering & Equip. Co. Sturgeon Bay Rd., Rt. 1, Green Bay, Wisc.

Johnson-March 3018 Market St., Philadelphia

Joy Manufacturing Co. 401 Oliver Bldg., Pittsburgh

Pulverizing Machinery Div. American-Marietta Co. 53 Chatham Rd., Summit, N. J.

Edw. Renneburg & Sons Co. 2639 Boston St., Baltimore 24

A. J. Sackett & Sons 1737 S. Highland Ave., Baltimore

Claude B. Schneible Co. 2827 25th St., Detroit, Mich.

Wheelabrator Corp. Mishawaka, Ind.

DUST MASKS - See Masks

ELEVATORS

Atlanta Utility Works
East Point, Ga.

Beaumont Birch Co. 1505 Race St., Philadelphia 2 (chain links)

Protox 7700 Protox 7702 EMULSIFIERS

For dormant and summer spray oils

PROCESS CHEMICALS CO. 8733 S. Dice Rd., Santa Fe Springs, Calif.

See advertisement on Page 90

Chain Belt Co. 4795 W. Greenfield Ave., Milwaukee 1

Davidson Kennedy Co. Box 97. Station D. Atlanta

Fertilizer Engineering & Equipment Co. Sturgeon Bay Rd., Rt. 1, Green Bay, Wisc.

Jeffrey Mig. Co. E. First Ave. & 4th St., Columbus 16

Kennedy-Van Saun Mig. & Engr. Corp.

405 Park Ave., New York

New London Engineering Co. New London, Wisc.

Link Belt Co. Prudential Plaza, Chicago 1

Sturtevant Mill Co. 123 Clayton St., Boston 22

Universal Hoist Co. Box 150, Cedar Falls, Iowa

EMULSIFIERS

Armour Ind. Chem. Co. 110 N. Wacker Drive, Chicago 6, Ill.

Atias Chemical Industries, Inc. Wilmington 99, Del. (Atlox)

Antara Chemicals Div., General Aniline & Film Corp. 435 Hudson St., New York 14 (Antarite)

National Aniline Div., Allied Chem. Corp. 40 Rector St., New York

Nopco Chemical Co. 60 Park Pl., Newark, N. J. (Agrimuls)

(Tritons)

(Sole A Mulse)

Petrochemicals Co.

1825 E. Spring St., Long Beach 6, Calif.

Process Chemicals Co.

8733 S. Dice Rd., Santa Fe Spr., Cal.
(protox)

Rohm & Haas Co. 222 W. Washington Sq., Philadelphia

Stepan Chemical Co.
Edens & Winnetka, Northfield, Ill.

(Toximuls)

Sole Chemical Corp.

7740 S. Chicago Ave., Chicago 19

Complemental Emulsification System

Agrimul N4R Agrimul A-100 Agrimul N4S Agrimul N-100

NOPCO CHEMICAL CO. 60 Park Place, Newark, N. J.

TRITONS

Triton X-152 and X-172 emulsifiers in posticide formulations can eliminate foam problems—insure capacity payloads in spray tanks.

> ROHM & HAAS Philadelphia 5, Pa.

See advertisement on Page 44

Thompson-Hayward Chem. Co. Box 768, Kansas City 8, Mo.

Witco Chemical Co., Inc. 122 E. 42nd St., New York 7 (Emcol)

ENDRIN — See Insecticides

ENGINEERS—See Fertilizer Plants

FEED SUPPLEMENTS — See Animal Feed Supplements

FEEDERS

Atlanta Utility Works
East Point, Ga.

BIF Industries 536 Harris Ave., Providence 1, R. I.

Cleveland Vibrator Co. 2828 Clinton Ave., West Cleveland 13, Ohio

Davidson Kennedy Co. P. O. Box 97, Station D, Atlanta

Hardinge Co. 240 Arch St., York, Pa.

Jeffrey Mig. Co. E. First Ave. & 4th St., Columbus 16

C. S. Johnson Co., Div. Koering Co. Champaign, Ill.

Kennedy-Van Saun Mig. & Eng'g Corp.

405 Park Ave., New York

Pulva Corp. 505 High St., Perth Amboy, N. J.

A. J. Sackett & Sons 1737 S. Highland Ave., Baltimore

Blend-O. Mixer

FERTILIZER PLANT

CONTINENTAL SALES CO.

Box 212. Nevada, Iowa

See advertisement on Page 139

EMCOLS

to produce top-quality concentrates of a wide range of chlorinated hydrocarbon and organic phosphate toxicants H-300X • H-500X • H-710 • H-712 • H-714 • H-140 • H-141 • H-A • H-B • H-C

WITCO CHEMICAL CO. 122 E. 42nd St., New York 17

See advertisement on Page 118

Schaffer Poidometer Co. 2828 Smallman St., Pittsburgh 22

Syntron Co. 579 Lexington Ave., Homer City, Pa.

Weighing & Control Components, Inc. 206-P Lincoln Ave., Hatboro, Pa.

FERTILIZER PLANTS (Design, Engineering and Construction)

Agricultural Business Co. Lawrence, Kans.

Atlanta Utility Works
East Point, Ga.

Barnard & Leas Mig. Co. 1234 12th St., S.W., Codar Rapids, Ia.

Blaw Knox Co. 300 6th St., Pittburgh 22, Pa.

Blue Valley Equipment Mig. & Engineering Co. Laurent & N. Taylor Sts., Topeka, Kans.

Butler Mig. Co. 7400 E. 13th St., Kansas City 26

J. C. Carlile Corp. Cooper Bldg., Denver 2, Colo.

Chemical Construction Corp. 320 Park Ave., New York

Chemical & Industrial Corp.

Continental Sales Co. Box 212, Nevada, Ia.

Davidson-Kennedy Co. 1090 Jefferson SW, Atlanta, Ga

Dorr-Oliver, Inc. Stamford, Conn.

Fertilizer Eng'g & Equipment Co. Sturgeon Bay Rd., Rt. 1, Green Bay, Wisc. Fluor Corp., Ltd. 2500 S. Atlantic St., Los Angeles 22

Foster Wheeler Corp. 666 5th Ave., New York

Girdler Corp.
Louisville, Ky.

M. W. Kellogg Co. 711 Third Ave., New York

Leonard Construction Co. 37 S. Wabash Ave., Chicago 3, Ill.

Longhorn Construction Co. P. O. Box 336, Sulphur Springs, Tex.

Lummus Co. 385 Madison Ave., N. Y. 17

Manitowoc Shipbuilding, Inc. Manitowoc, Wisc.

F. H. McGraw 51 E. 42nd St., New York

Midstates Machinery 359 E. Main St., Decatur, Ill.

Robert F. McCloskey Engineering Co. Highland Bldg., E. Liberty, Pa.

Poulsen Co. 2341 8th St., Los Angeles 21

A. J. Sackett & Sons 1737 S. Highland St., Baltimore

Saumico Engineering Co. Saumico, Wisconsin

Standard Steel Mig. Co. 2137 N. Sherman Dr., Indianapolis

Vulcan Engineering 120 Sycamore, Cincinnati

D. M. Weatherly Co. 80 Eleventh St., Atlanta, Georgia

Wellman-Lord Engineering Co. P.O. Box 2436, Lakeland, Fla.

John W. Williamson & Sons 666 West Putnam Dr. Whittier, Calif.

FILLING EQUIPMENT

Mateer Co., G. Diehl 776 W. Lincoln, Wayne, Pa.

Pneumatic Scale 67 Newport Ave., Quincy 71, Mass.

Stokes & Smith, Div. F.M.C. 4988 Summerdale Ave., Phila., Pa.

U. S. Bottlers Machinery Co. 4015 N. Rockwell St., Chicago 18

PRODUCTION EQUIPMENT

- Coolers
 Dryers
- Mixers Mills
- Granulators
- Ammoniators

A. J. SACKETT & SONS CO. 1737 S. Highland Ave., Baltimore, Md.

See advertisement on Page 67

Filling Machinery

Automatic Semi-automatic

FMC Auger Fillers

FMC Packaging Machinery Div. STOKES & SMITH

4988 Summerdale Ave.

Phila., Pa

FLUORIDES — See Insecticides

FORMULATORS—See Insecticide Formulators

FRONT END LOADERS — See Tractor Shovels

FUMIGANTS (For stored grain, etc.)

American Cyanamid Co. Princeton, N. J.

American Potash & Chem. Corp., Eston Div. 3000 West Sixth St.

3000 West Sixth St., Los Angeles 54

Diamond Alkali Co. 300 Union Comm. Bldg., Cleveland, 16

Dow Chemical Co. Midland, Mich.

Ferguson Fumigants P.O. Box 5868, Ferguson 35, Mo.

Frontier Chemical Co. Div. Vulcan Materials Co. Wichita I, Kans.

Great Lakes Chemical Corp. 500 Fifth Ave., New York 38

Kolker Chemical Corp.
600 Doremus Ave., Newark 5, N. J.

Michigan Chemical Corp. St. Louis, Mich.

Shell Chemical Corp. 50 W. 50th St., New York

Stauffer Chemical Co. 380 Madison, N. Y. 17

FUMIGANTS, SOIL — See Nematocides

FUMIGATION TARPAULINS —See Tarpaulins

FUNGICIDES

American Cyanamid Co. Princeton, N. J. (Cyprex)

Berkshire Chemicals, Inc. 630 Third Ave., New York 17, N. Y. (Dithiocarbamates, Mercury Cmpds.)

Calumet Div., Calumet & Hecla, 25 Calumet Ave., Calumet, Mich. (Fungicide Grade Copper Oxide)

Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va.

Chemical Insecticide Corp. 30 Whitman Ave., Metuchen, N. J. (Chem-Bam)

Chipman Chemical Co.

Bound Brook, N. J.

(Chipcote Copper Fungicides,
Wettable Sulfurs)

W.A. CLEARY CORP.

New Brunswick, New Jersey Belleville, Ont., Canada

Thiram Fungicides

Mercurial Fungicides
 Cadmium Fungicides

Disodium Methyl Arsonate
 Crabgrass Killer

 Amine Methyl Arsonate Crobgrass Killer

Insecticide Formulators

See advertisement on Page 145

W. A. Cleary Corp.
P.O. Box 749, New Brunswick, N. J.
(Phenyl Mercury Acetate)

Diamond Alkali Co.
300 Union Comm. Bldg., Cleveland, 14
(Hexachlorobenzene, seed protectant)

Dow Chemical Co. Midland, Mich. (Dowicides)

E. I. du Pont de Nemours & Co. Wilmington, Del. (Dithiocarbamates, Coppers, Mercuririals, Wettable Sulfurs)

Faesy & Besthoff, Inc. 25 E. 26 St., New York 10 (Copper Sulfate, Nabam)

Frontier Chemical Co.
Div. Vulcan Materials Co.
Wichita 1, Kansas
(Pentachlorophenol)

Gallowhur Chemical Corp. N. Water St., Ossining, N. Y. (Organo-Mercury Compounds)

General Chemical Div. Allied Chemical Corp. 40 Rector St., New York 6

Irvington Smelting & Refining Co. 374 Nye Ave., Irvington, N. J.

Kalo Inoculant Co. 525 Kentucky St., Quincy, Ill. (Seed Treatment)

Metal & Thermit Co. Rahway, N. J.

Metalsalts Corp. 200 Wagrow Rd., Hawthorne, N. J. (Mercury Compounds)

Merck & Co. Rahway, N. J. (Antibiotics)

Mallinckrodt Chemical Works 3600 Second St., St. Louis (Mercury Compounds)

Miller Chemical & Fertilizer Corp. Baltimore 15, Md. (Copper-Zinc-Chromate Complex)

Monsanto Chemical Co. St. Louis, Mo. (Ortho nitro chlorobenzene, Pentachlorophenol)

Morton Chemical Co., Agricultural Div. 110 N. Walker Dr., Chicago 6

Nationwide Chemical Co. P. O. Box 775, Fort Myers, Fla. (Nabac-25) Naugatuck Chemical Div. U. S. Rubber Co. Naugatuck, Conn. (Phygon, Spergon)

Niagara Chemical Div., Food Machinery & Chem. Corp. Middleport, N. Y. (Nabam, Niacide)

Olin-Mathieson Chem. Corp. 10 Light St., Baltimore 3 (Terraclor, Omazene)

Ortho Div., California Chemical Co. Richmond, Calif. (Phaltan)

Phelps Dodge Refining Corp. 300 Park Ave., New York 22 ("Triangle Brand" Copper Sulphate)

Phillips Bros. Chemicals 10 Columbus Circle, N.Y.C. (Copper sulfate)

Chas. Pfizer & Co. 630 Flushing Ave., Brooklyn, N. Y. (Antibiotics)

Reade Mig. Co. 130 Hoboken Ave., Jersey City 2, N. J.

Refined Products Corp. Lyndhurst, N. J. (Perma-cides)

Republic Chemical Corp. 94 Beekman St., New York 38 (Copper Sulphate)

Robeco Chemicals Inc. 25 East 26th St., N. Y. C. (copper sulfate, copper oxychloride)

Roberts Chemicals, Inc. Nitro, W. Va. (Amobam, Diram, Ferbam, Thiram, PMAC, Nabam, Ziram)

Robertson Co., H. H. 2434 Farmers Bank Bldg., Pittsburgh 22

Rohm & Haas, Inc. Washington Sq., Philadelphia 5 (Dithane, Karathane)

Shepard Division of South American Minerals & Merchandising Corp. 425 Park Ave., New York 22

Stauffer Chemical Co. 380 Madison Ave., New York 17 (Captan, Phaltan, Sulfur)

Tennessee Corp. 617 Grant Bldg., Atlanta (Tri-Bosic Copper Sulphate)

Union Carbide Chemicals Corp., Div. Union Carbide Corp. 30 E. 42nd St., New York 17 (Glyodin)

R. T. Vanderbilt Co. 230 Park Ave., New York 17 (Vancide)

Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11 (Emmi)

Woodridge Chemical Corp.
50 Park Pl. East, Woodridge, N. J.
(Mercurials)

GIBBERELLIC ACID — See Plant Growth Regulators

GLOVES-GOGGLES-See Masks

AGRICULTURAL CHEMICALS

GRANULATORS - See Ammoniators

GRINDERS — See Mills

GREENHOUSE — Portable

Waco-Porter Corp. 3565 Wooddale Ave., Minneapolis

HEPTACHLOR — See Insecticides

HERBICIDES

Amchem Products Inc. Ambler, Pa. (2,4-D, 2,4,5-T, Amiben, Amitrol, Weedazol, Benzac-Sesone)

American Cyanamid Co. Princeton, N. J.

(Cytrol)

American Smelting & Refining Co. 120 Broadway, New York 5 (Arsenates)

Berkeley Chemical Corp. Summit Avenue, Berkeley Heights,

J. D. Campbell & Sons Ltd. Lund St., Manchester 16, England (CMPP)

Chemagro Corp. North Mall, Willow Lawn Richmond 30, Va.

Chipman Chemical Co.

Bound Brook, N. J. (Arsenicals, Chlorates 2.4-D, 2.4-DB)

Chemical Insecticide Corp. 30 Whitman Ave., Metuchen, N. J. (Sodium Arsenite, Aquatic Herbicide, 2.4-D)

W. A. Cleary Corp.
P.O. Box 749, New Brunswick, N. J. (methylarsonates)

Columbia-Southern Chemical Corp. 632 Fort Duquesne Blvd., Pittsburgh 22 (Chloro-IPC)

Dow Chemical Co. Midland, Mich. (2,4-D, 2,4,5-T, Zytron, Forron)

Diamond Alkali Co.

300 Union Comm. Bldg., Cleveland, 14 (2,4-D, 2,4,5-T)

Eastman Chemical Products, Inc.

Kingsport, Tenn. (2-ethyl hexoic acid, 2-ethyl hexyl acid, and 2-ethyl iso hexyl acid-

VACATE WEEDS

With Vocate, Diamond's new nonselective herbicide for dry application

DIAMOND ALKALI CO.

300 Union Commerce Building Cleveland 14, Ohio

See advertisement on Page 60

Intermediates for production of herbicides)

E. I. du Pont de Nemours & Co. Wilmington, Del. (Ammate, Dybar, Karmex, Kloben, Telvar, Trysben, Zobar)

Faesy & Besthoff, Inc. 25 East 26th St., New York 10 (Herbisan, sodium arsenite solution)

General Chemical Div Allied Chemical Corp.
40 Rector St., New York 6
(Calcium Arsenate Granular, Urox, Urab, HCA)

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y. (Atrazine, Simazine)

Heyden-Newport Chem. Corp. 342 Madison Ave., New York (Trichlorobenzoic Acid)

Hooker Chemical Corp. 609 Buffalo Ave., Niagera Falls, N. Y. (Sodium Chlorate)

Monsanto Chemical Co. St Louis 24, Mo. (Randox, Vegadex)

Naugatuck Chem. Div. U. S. Rubber Co. Naugatuck, Conn. (Alanap, Falone)

Niagara Chemical Div., FMC Middleport, N. Y. (Casoron, Dinitro)

Pennsalt Chemicals Corp. Tacoma, Wash. (Endothal)

Reade Mig. Co. 135 Hoboken Ave., Jersey City 2, N. J.

Reasor-Hill Corp.
Box 36, Jacksonville, Ark. (Aquatic Herbicide)

Robeco Chemicals Inc. 25 East 26th St., New York (TCA)

Roberts Chemicals, Inc. Nitro, W. Va. (Herbisan 5)

Rohm & Haas Co.

Washington Sq., Philadelphia (Stan F-34)

Shell Chemical Corp. 460 Park Ave., New York 22 (Aqualin, aquatic herbicide)

Oldbury

Sodium Chlorate

To Control Johnson Grass, Bindweed, Canada Thistle, & Russian Knapweed

HOOKER CHEMICAL CORP. 609 Buffalo Ave. Niagara Falls, N. Y.

See advertisement on Page 127

Shepard Div. of South American Minerals & Merchandising Corp. 425 Park Ave., New York 22 (MCPA, MCPP)

Stauffer Chemical Co. 380 Madison Ave., New York 17 (Eptam)

Thompson-Hayward Chemical Co. Box 768, Kansas City 8, Mo. (2,4-D and 2,4,5-T)

Union Carbide Chemicals Co. Div., Union Carbide Corp. 30 E. 42nd St., New York 17 (Sesone)

U. S. Borax

630 Shatto Pl., Los Angeles 5 (Ureabor, Polybor-chlorate, Borascu)

Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11 (Banvel)

Virginia-Carolina Chemical Corp. Richmond, Va. (V-C Folex, cotton defoliant)

HORMONES — See Plant Growth Regulators

INSECTICIDE FORMULATORS (manufacturers of finished pesticides for sale in bulk

Acock Laboratories 2700 E. 5th St., Austin, Tex.

Agricultural Chemicals, Inc. Walnut Grove, Calif.

Agricultural Chemicals, Inc. Llano, Texas

Agricultural Specialties 12200 Denton Dr., Dallas, Tex.

Agricultural Chemical Service Co. Montgomery, Ala.

Agricultural Pesticide Chemical Co. Hibernia Bldg., New Orleans, 12

Ortho Div., California Chemical Co. Richmond, Calif.

Carolina Chemicals, Inc. P. O. Box 138, West Columbia, S. Car.

Central Chem. Co 49 N. Jonathan St., Hagerstown, Md.

Chapman Chem. Co. 38 Court St., Memphis, Tenn.

Chem. Insecticide Corp. 30 Whitman Ave., Metuchen, N. J.

MANUFACTURERS OF SODIUM ARSENITE SOLUTIONS

READE MFG. CO. INC. 130 Hoboken Avenue JERSEY CITY 2, N. J.

PLANTS: JERSEY CITY, N. J., CHICAGO, ILL., N. KANSAS CITY, MO., BIRMINGHAM ALA.,

INSECTICIDE FORMULATORS (Contd.)

Chipman Chemical Co.
Bound Brook, N. J.

W. A. Cleary Corp.
P. O. Box 749, New Brunswick, N. J.

William Cooper & Nephews, 1909 Clifton St., Chicago

Corona Chemical Div.
Pittsburgh Plate Glass Co.
Pittsburgh, Pa.

Douglas Chem. Co. 620 E. 16th Ave., N. Kansas City, Mo.

Durham Chem. Co. 4124 E. Pacific Way, Los Angeles

Faesy & Besthoff, Inc. 25 East 26th St., New York 10

Flag Sulphur & Chem. Co. Tampo, Fla.

Florida Agricultural Supply Co. Box 658, Jacksonville, Fla.

Freeno Agricultural Chem. Co. Freeno, Calif.

General Chemical Div.

Allied Chemical Corp.

40 Rector St., New York 6

Georgia-Carolina Oil Co. 1403 Sixth St., Macon, Ga.

Hayes-Sammons Co. Mission, Texas

Howerton Gowen Co. East 11th St., Roanoke Rapids, N. C.

O. E. Linck Cc. Route 6 & Valley Rd., Clifton, N. J.

C. J. Martin & Sons 413 Chicon St., Austin, Texas

Michlin Chemical 9045 Vincent St., Detroit. Mich.

Millmaster Chem. Corp. 295 Madison Ave., New York 17

Naco Fertilizer Co. Box 858, Charleston, S. C.

Oregon Agricultural Chemicals, Tulelake, Calif.

W. R. Peele Co. 516 S. Salisbury St., Raleigh, N. C.

Plainsman Supply Co Plainview, Texas Planters Chemical Corp. 3111 Virginia Beach Blvd., Norfolk, Va

Port Fertilizer & Chem. Co. Los Fresno, Tex.

Private Brands, Inc. 300 S. 3rd St., Kansas City, Kan.

Quality Chemical Corp. Box 70, Wilson, N. C.

Ralston Purina Co. 835 S. 8th St., St. Louis

Reasor-Hill Corp. Jacksonville, Ark.

Riverdale Chemical Co. Chicago Heights, Ill.

Sherwin-Williams Co. 101 Prospect Ave., N.W., Cleveland 1

Southwest Co-operative Wholesale 1821 E. Jackson St., Phoenix, Ariz.

Stauffer Chemical Co. 380 Madison, N. Y. 17

Taylor Chemical Co Aberdeen, N. C.

Thompson-Hayward Chemical Co. Box 768, Kansas City 8, Mo.

Tyner-Petrus Co. 100 Trenton St., West Monroe, La.

F. H. Vahlsing Elsa, Texas

INSECTICIDES, TECHNICAL (Concentrates and basic raw materials for use in the manufacture of finished formulations) including Arsenicals, Chlorinated Hydrocarbons and Phosphates

American Cyanamid Co. Princeton, N. J. (Parathion, Dicapthon, Malathion)

American Potash & Chem. Corp.. Eston Div. 3000 W. 6th St., Los Angeles 54 (Ethyl Parathion, Tetraethyl Pyrophosphate)

American Smelting & Refining Co 120 Broadway, New York 5 (Arsengtes)

Chemagro Corp.
Hawthorne Rd., Kansas City, Mo.
(Parathion, Methyl Parathion)

Chipman Chemical Co. Bound Brook, N. J. (Arsenates) CIBA Ltd.

Basle, Switzerland
(Dimecron)

W. A. Cleary Corp.
P. O. Box 749, New Brunswick, N. J. (Arsenates)

Commercial Solvents Corp. 260 Madison Ave., New York 16 (Dilan, Metaldehyde)

Diamond Alkali Co. 300 Union Commerce Bldg., Cleveland (BHC, Lindane, DDT, TEPP)

E. I. du Pont de Nemours & Co. Wilmington, Del. (DDT, Methoxychlor)

Durham Chemical Co. 4124 E. Pacific Way, Los Angeles 23 (DDT, Parathion)

Eastman Chemical Products, Inc. Kingsport, Tenn. (Triethyl Phosphate—intermediate for TEPP)

Fairfield Div., FMC 441 Lexington Ave., New York 17

Flag Sulphur & Chem. Co. P. O. Box 5737, Tampa 5, Fla. (DDT, Parathion, Malathion)

Frontier Chemical Co., Div. Vulcan Materials Co. Wichita 1, Kans. (BHC)

General Chem. Div., Allied Chem. Corp. 40 Rector St., New York 6 (DDT, TDE, Calcium Arsenate, Lindane, Potassium Cyanate 92%)

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y. (Methoxychlor, DDT, Diazinon)

R. W. Greeff & Co. 10 Rockefeller Plaza, New York 20 (DDT)

Harshaw Chemical Co. 1945 East 87th St., Cleveland 6, Ohio (Cryolite)

Hercules Powder Co. 900 Market St., Wilmington, 99, Del (Toxaphene, Thanite, Delnav)

Heyden Newport Chem. Corp. Heyden Chemical Div. 342 Madison Ave., New York 17 (Chlorotoluene derivatives)

CHIPMAN

- Insecticides
- Fungicides
- Herbicides
- Defoliants

CHIPMAN CHEMICAL CO. Boundbrook, N. J.

See advertisement on Page 135

PYRETHRUM DUST BASES

containing piperonyl butoxide and pyrethrins

Are available to insecticide formulators and processors nationally

FAIRFIELD CHEMICALS, FMC 441 Lexington Ave., New York 17

See advertisement on 4th Cover

BASIC CHEMICALS

for Herbicides, Pesticides Animal Feeds

Manganese for fertilizer and nutritional sprays

PRODUCTS, INC.

Kingsport, Tenn.

See advertisement on Pages 108,109

PENCO

Agricultural Chemicals

PENNSALT CHEMICALS CORP.

Tacoma 1, Washington

See advertisement on Page 47

Lebanon Chemical Corp. P. O. Box 532, Lebanon, Pa. (DDT)

Marks & Leeds Co., Ltd. P.O. Box 43-106, S. Miami, Fla.

Monsanto Chemical Co. St. Louis, Mo. (Parathion, Methyl Parathion)

Nationwide Chemical Co. Box 775, Ft. Myers, Fla. (Pyrelin)

Niagara Chemical Div., FMC Middleport, N. Y. (BHC, DDT, Lindane, TEPP, Thiodan, Ethion, Phostex, Tedion)

Olin-Mathieson Chemical Corp. 10 Light St., Baltimore (DDT, BHC)

S. B. Penick & Co. 4161 Beck Ave., St. Louis 16 (Chlordane, Lindone, DDT, Malathion)

Pennsalt Chemicals Corp. Tacoma, Wash. (BHC, DDT, Lindane, Malathion)

Phillips Bros. Chemicals 10 Columbus Circle, NYC

Prentiss Drug & Chemical Co. 101 West 31st St., New York 1 (Chlordane, DDT, Lindane, Malathion)

Robeco Chemicals Inc. 25 E. 26th St., New York (Lindane, DDVP)

Rohm & Haas Co. Washington Sq., Philadelphia 5 (Perthone, Rhothane, Lethane)

Shell Chemical Corp.

460 Park Ave., New York 22
(Aldrin, Dieldrin, Endrin, Vapona,
Phosdrin, Methyl Parathion)

Shepard Div., South American Minerals & Merchandising Corp. 425 Park Ave., New York 22 (Arsenates, Lindane, Nicotine)

Sherwin-Williams Co. 101 Prospect Ave., N.W., Cleveland 1 (Arsenicals)

Stauffer Chemical Co. 380 Madison Ave., New York 17 (Parathion, Trithion, Methyl Parathion, DDT, BHC, Lindane)

Union Carbide Chemicals Co. Div., Union Carbide Corp. 270 Park Ave., New York 17 (Sevin)

Geigy

Agricultural Chemicals

Diazinon Insecticide Methoxychlor Insecticide Atrazine Herbicide Simazine Herbicide Chlorobenzilate Miticide Sequestrene Chelates

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y. See advertisement on Pages 64-65

United-Chemetrics Co. 600 S. 4th St., Richmond, Calif. (DDT, Cryolite)

Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11 (Chlordane, Endrin, Heptachlor, Parathion, Methyl Parathion)

Victor Chemical Works Div. of Stauffer Chemical Co. 155 N. Wacker Dr., Chicago 6 (Methyl Parathion)

INSECTICIDES, BOTANICAL

(Pyrethrum, Rotenone, Allethrin, Cube, Derris, Ryania, Sabadilla, etc.)

Chemical Insecticide Corp 30 Whitman Ave., Metuchen, N. J.

Fairfield Chemical Div., FMC 441 Lexington Ave., New York 17

McLaughlin Gormley King Co. 1715 S. E. 5th St., Minneapolis

S. B. Penick & Co. 4161 Beck Ave., St. Louis 16

Prentiss Drug & Chem. Co. 101 West 31st St., New York 1

INSECTICIDES, MICROBIAL

Amino Div., International Minerals & Chemical Corp.

Skokie, Ill. (Thuricide)

Fairfax Biological Laboratory Clenton Corners, N. Y. (Doom, Japidemic)

Grain Processing Corp. Muscatine, Iowa (Parasporin)

Merck & Co. (Bacillus Thuringiensis) Rahway, N. J.

Nutrilite Products, Inc. 5600 Grand Ave., Buena Park, Calif. (Biotrol)

Pennsalt Chemicals Corp. Tacoma, Wash. (Biotrol BTB)

Rohm & Haas Co. Washington Sq., Philadelphia S, Pa.

PESTICIDES

Malathion • Chlordane

Pyrethrum • DDT • Heptachlor Dieldrin • Lindane • Rotenone Pyrethrins and Piperonyl Butoxide Aerosol Concentrates

Prentiss Drug & Chemical Co. 101 West 31st St. New York 1, N. Y.

See advertisement on Page 3

Stauffer Chemical Co. 380 Madison, N. Y. 17 (Thuricide)

INSECTICIDES (Trade or Common Name Products)

Aldrin Shell Chemical Corp. 460 Park Ave., New York 22

Aramite
Naugatuck Chemical Div.,
U. S. Rubber Co.
Naugatuck, Conn.

Butonate S. B. Penick & Co. 4161 Beck Ave., St. Louis 16

Prentiss Drug & Chem. Co. 101 West 31st St., New York 11

Chlordane Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11

Chlorobenzilate
Geigy Agricultural Chemicals
Saw Mill River Rd., Ardsley, N. Y.

Co-Ral Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va.

Hercules Powder Co. 900 Market St., Wilmington 99, Dela.

Diazinon Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y.

Dicapthon
American Cyanamid Co.
Princeton, N. J.

Dieldrin Shell Chemical Corp. 460 Park Ave., New York 22

Dilan Commercial Solvents Corp.

260 Madison Ave., New York 16

CIBA Ltd. Basle, Switzerland Dipterex.

Chemagro Corp.
N. Mall, Willow Lane,
Richmond 30, Va.

Davison Chemical Div., W. R. Grace & Co. Baltimore 3, Md.

NUVAN

(on base of DDVP)

A vinyl phosphate outstanding as contact and fumigation insecticide

CIBA, LTD.

Basle, Switzerland

See advertisement on 2nd Cover

INSECTICIDES — Trade Name (Contd.)

Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va.

Endrin Shell Chemical Corp. 460 Park Ave., New York 22

Velsicol Chemical Corp. 330 E. Grand Ave., Chicago

Niagara Chemical Div., FMC Middleport, N. Y.

Guthion Chemagro Corp. Hawthorne Rd., Kansas City, Mo.

Heptachlor Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11

Kelthane

Rohm & Haas Co Washington Sq., Phila 5

Lethane Rohm & Haas Co. Washington Sq., Phila. 5

Malathion

American Cyanamid Co. Princeton, N. J.

Commercial Solvents Corp. 260 Madison Ave., New York 16

Ciba, Ltd. Basle, Switzerland

OMPA. (Sytam)

Pennsalt Chemicals Corp. Tacoma, Wash.

Rohm & Haas Co. Washington Sq., Philadelphia 5

Phosdrin Shell Chemical Corp. 460 Park Ave., New York 22

Phosphamidon
Ortho Div., California Chemical Co.
Richmond, Calif.

Phostex

Niagara Chemicals Div., FMC Middleport, N. Y.

Pyrenone

Fairfield Chemicals Div., FMC 441 Lexington Ave., New York 17

PHOSDRIN

Provides fast knockdown and kill of insects without residue problems.

SHELL CHEMICAL CO.

Agricultural Chemicals Div.

460 Park Ave., New York 22

See advertisement on Page 25

Pyrelin

Nationwide Chemical Co., Inc. P. O. Box 775, Ft. Myers, Fla.

Rhothane

Rohm & Haas Co. Washington Sq., Phila. 5

Union Carbide Chemicals Co. Div., Union Carbide Corp. 270 Park Ave., New York 17

Silikil

United-Chemetrics 6008 4th St., Richmond, Calif.

Strobane

Heyden Newport 342 Madison Ave., New York

Systox

Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va.

Pennsalt Chemicals Corp. Tacoma, Wash.

General Chemical Div. Allied Chemical Corp. 40 Rector St., New York 6

Tedion

Niagara Chemical Div., FMC Middleport, N. Y.

Thimet

American Cyanamid Co. Princeton, N. J.

Niagara Chemical Div. FMC Middleport, N. Y.

Thiram

Pennsalt Chemicals Corp. Tacoma, Wash.

INSECTICIDE

SPRAY and DUST FORMULATIONS

UNION CARBIDE CHEMICALS CO.

Division of Union Carbide Corporation 270 Park Ave., New York 17, N. Y.

SEVIN is a registered trade-mark of Union Carbide Corporation.

See advertisement on Page 129

Hercules Powder Co. 900 Market St., Wilmington 99, Del.

Toxaphene Hercules Powder Co. 900 Market St., Wilmington 99, Del.

Stauffer Chemical Co. 380 Madison Ave., New York 17

Trolene

Dow Chemical Co. Midland, Mich.

Vapona

Shell Chemical Co. 460 Park Ave., New York 22, N. Y.

LABEL AND PACKAGE DESIGN

Cameo Die & Label Co. 154 W. 14th Street, New York 11 N. Y.

Richard de Bang Co. 826 Seventh Avenue, New York 17

Donrico Inc. 438 West 37th Street, New York 18

Walter Frank Organization 4100 Warren Avenue, Hillside, Ill.

Donald Palmer, Inc. 2627 Tchoupitoulas St., New Orleans

A. H. Wirz, Inc. Fourth & Townsend Sts., Chester, Pa.

LABELERS

Burt Machine Co. 401 E. Oliver Street, Baltimore 2, Md.

Potdevin Machine Co. 200 North Street, Teterboro, N. J.

Standard-Knapp Division, Emhart Manufacturing Co. Main Street, Portland, Conn.

LABORATORY APPARATUS AND **EQUIPMENT**

Analytical Measurements, Inc. 585 Main St., Chatham, N. J. (pH meter)

Beckman Instruments, Inc. 2500 Fullerton Rd., Fullerton, Calif.

Burrell Corp. 2223 Fifth Ave., Pittsburgh

Cargille Scientific, Inc. 117 Liberty St., N. Y. 6

Central Scientific Co. 1700 W. Irving Pk., Chicago

Eimer & Amend 633 Greenwich St., New York, N. Y.

Fisher Scientific Co. 717 Forbes St., Pittsburgh

Harshaw Chemical Co., Scientific Div. Hastings-on-Hudson, N.Y.

Kensington Scientific Corp. 99 Rincon Rd., Berkeley 7, Calif.

Kimble Glass Co. Toledo 1, O.

Labline, Inc. 3070 W. Grand St., Chicago (Rooms for plant & soil study) Laboratory Furniture Co. Mineola, L. I., New York

Soiltest, Inc. 237 Sheffield, Mountainside, N. J.

Standard Scientific Supply Corp. 808 Broadway, New York 3

Arthur H. Thomas Co. Vine St. at 3rd., Phila.

Will Corp. 39 Russel St. Rochester, N. Y.

LABORATORY CHEMICALS (Reagents)

J. T. Baker Chemical Co. Phillipsburg, N. J.

Fine Organics, Inc. 205 Main St., Lodi, N. J.

Fisher Scientific Co. 717 Forbes St., Pittsburgh

General Chemical Div. 40 Rector St., N. Y.

Harshaw Chemical Co. 1945 E. 97th St., Cleveland

Mallinckrodt Chemical Works 3600 N. 2nd St., St. Louis

Merck & Co. Rahway ,N. J.

Arthur H. Thomas Co. Vine St., at 3rd., Phila.

LEAD ARSENATE — See Insecticides

LIFT TRUCKS

Allis-Chalmers Mfg. Co. 1150 S. 70 St., Milwaukee 1, Wis.

Barrett-Cravens Co. 630 Dundee Rd., Northbrook, Ill.

Clark Equipment Co. 2463 Pipestone Rd., Benton Harbor, Mich.

Elwell-Parker Co. 4205 St. Clair Ave., Cleveland

Lewis Shepard Products 125 Walnut St., Watertown, Mass.

Yale & Towne Mig. Co. 11000 Roosevelt Blvd., Philadelphia

LIME

American Limestone Co. Knoxville, Tenn.

Ashcraft Wilkinson Co. Atlanta Ga.

Dolcito Quarry Co. Birmingham, Ala.

Marble Products Co. of Georgia First National Bank Bldg., Atlanta 3,

Moores Lime Co. Springfield, O.

National Lime & Stone Co. Findlay, Ohio

Ohio Lime Company Woodville, Ohio

MAGNETIC FLOW METERS

Eliminate the amplifier from pH recording and control

A simple, economical method for measuring pH

THE FOXBORO COMPANY 139 Norfolk St., Foxboro, Mass.

See advertisement on Page 21

U. S. Gypsum Co. 300 W. Adams St., Chicago 6

West End Chemical Co. 1956 Webster, Oakland 12, Calif.

Willingham-Little Stone Co. Fulton National Bank Bldg., Atlanta 3,

LINDANE - See Insecticides

LIQUID FERTILIZER PLANTS

Barnard & Leas Mig. Co. 1202 Twelfth St., Cedar Rapids, Ia.

J. C. Carlile Corp. Cooper Bldg., Denver 2, Colo.

Plant Food Equipment Co. 5000 Connecticut St., St. Louis

Ris-Van, Inc. Subsid. Stepan Chemical Co. Belmond, Iowa

LOADERS — See also Tractor Shovels

Finco, Inc. Conveyor Div. Aurora, Ill. (box car loading device)

MAGNETIC SEPARATORS — See Separators, Magnetic

MALATHION - See Insecticides

MALEIC HYDRAZIDE—See Plant Growth Regulators

MASKS (Dust Masks, Gas Masks, Goggles, Respirators, etc.)

Acme Protection Equipment Co. 1202 Kalamazoo St., S. Haven, Mich.

American Optical Co. Mechanics St., Southbridge, Mass.

Bausch & Lomb Optical Co. Rochester 2, N. Y.

Chicago Eye Shield Co. 2300 Warren Blvd., Chicago, Ill.

Flexo Products, Inc. Westlake, Ohio

Hub States Chemicals & Equip. 1255 N. Windsor St., Indianapolis, Ind. Martindale Electric Co. 1367 Hird Ave., Cleveland 7, Ohio

Mine Safety Appliances Co. 201 N. Braddock Ave., Pittsburgh 8

Pulmosan Safety Equipment Corp. 644 Pacific St., Brooklyn 17

Welsh Manufacturing Co. 66 Magnolia St., Providence, R. I.

Willson Products Div., Ray-O-Vac Co. 212 E. Washington, Madison, Wisc.

METAL CHELATES — See Chelating Agents

METERS AND GAUGES

Analytical Measurements 585 Main St., Chatham, N. J. (pH meters)

Badger Meter Mfg. Co. 4545 W. Brown Deer Rd., Milwaukee

BIF Industries 536 Harris Ave., Providence, R. I.

Bin-Dicator Co. 13946 Kercheval Ave., Detroit (Indicators, controls, switches)

Bowser, Inc. 1398 E. Creighton Ave., Ft. Wayne, Ind.

Buffalo Meter Co. 2935 Main St., Buffalo 14, N. Y.

Fisher & Porter Co.
1139 County Line Rd., Hatboro, Pa.

Foxboro Co. 139 Norfolk St., Foxboro, Mass.

Marsh Instrument Co. Skokie, Ill.

Neptune Meter Co. 47-25 34th St., Long Island City 1, N.Y.

Schaffer Poidometer Co. 2828 Smallman St., Pittsburgh 22

Squibb Taylor Co. 1213 S. Akard St., Dallas

Tokheim Corp. Fort Wayne, Ind.

METHOXYCHLOR — See Insecticides

METHYL PARATHION — See Insecticides

MINERALS, TRACE — See Trace Elements

MINOR ELEMENTS — See Trace Elements

MILLS (for pesticide grinding)

Bauer Bros Co. 1825 Sheridan Ave., Sprinfigeld, Ohio

Combustion Engineering Co., Raymond Div. 427 W. Randolph St., Chicago 6

IMP MILLS

for producing uniform insecticide dusts

Raymond Division

COMBUSTION ENGINEERING, Inc.

427 W. Randolph St. Chicago 6, III.

See advertisement on Page 106

PULVERIZING SYSTEMS

high production and low operating costs with the

Kennedy Air Swept Tube Mill Grinding System

KENNEDY VAN SAUN

Manufacturing & Engineering Corp. 405 Park Ave., New York 22

See advertisement on Page 62

Jet-O-Mizer Mills

Ene

Grinding and Dehydration
FINER PARTICLES
LOW MAINTENANCE

FLUID ENERGY PROCESSING & EQUIPMENT CO.

Richmond & Norris Sts.
Philadelphia 25

See advertisement on Page 136

Crushing and Grinding Machinery

JAW CRUSHERS ROTARY FINE CRUSHERS CRUSHING ROLLS HAMMER MILLS

STURTEVANT MILL CO.

123 Clayton St., Boston 22, Mass.

See advertisement on Page 141

BATCH MIXERS

Rotary Drum Batch Mixer Sizes

1/2 Ton 1 1/2 Ton 1 Ton 2 Ton

ATLANTA UTILITY WORKS East Point, Georgia

See advertisement on Page 140

MILLS (for pesticides) (Contd.)

Fluid Energy Processing & Equipt. Co. Richmond & Norris Sts. Phila. 25

Franklin P. Miller & Son 36 Meadow St., East Orange 48, N. J.

Munson Mill Machinery Co. 210 Seward Ave., Utica, N. Y.

Pulverizing Machinery Div. American-Marietta Co. 63 Chatham Rd., Summit, N. J.

Sturtevant Mill Co. 123 Clayton St., Boston 22

Williams Patent Crusher & Pulverizer Co. 813 Montgomery St., St. Louis

MILLS (for fertilizer grinding)

Abbe Engineering Co. 420 Lexington Ave., N. Y. 17

Allis-Chalmers Mig. Co. Milwaukee 1, Wisc.

Atlanta Utility Works East Point, Ga.

Bauer Bros Co. 1825 Sheridan Ave., Springfield, Ohio

Bonded Scale & Machine Co. 2176 S. 3rd St., Columbus 7, Ohio

Bradley Pulverizer Co. Allentown, Pa.

Combustion Engineering

Raymond Pulverizer Div. 427 W. Randolph St., Chicago 6

Davidson-Kennedy Co. 1090 Jefferson St., N. W., Atlanta

Delta Mig. Co. 603 Badgerow Bld., Sioux City, Ia.

Fertilizer Engr. & Equip. Co. Sturgeon Bay Rd., Rt. 1 Green Bay, Wis.

Gruendler Crusher & Pulverizer Co. 2920 N. Market St., St. Louis

Hardinge Co. York, Pa.

Inglett & Co. Box 3425, Augusta, Ga.

Inglett Dev. & Engineering Assoc. P. O. Box 177, Augusta, Ga.

Jeffrey Mfg. Co. E. First Ave. & 4th St., Columbus 16

Kennedy-Van Saun Mfg. & Engr. Corp.

405 Park Ave., New York 22

Longhorn Construction Co. Sulphur Springs, Tex.

Franklin P. Miller & Son 36 Meadow St., East Orange 48, N. J.

Edw. Renneburg & Sons 2639 Boston St., Baltimore 24

A. J. Sackett & Sons 1701 S. Highland Ave., Baltimore

Sturtevant Mill Co.

123 Clayton St., Boston 22

William Patent Crusher & Pulverizer Co. 813 Montgomery St., St. Louis, Mo.

MIXERS — BLENDERS (Automatic, Batch)

Agricultural Business Co. Box 36 Lawrence, Kansas

Atlanta Utility Works (Batch) East Point, Ga.

Andrews Machine Co. Decatur, Ill.

Barnard & Leas Mfg. Co. 1234 12th St., S.W., Cedar Rapids, Ia.

Brower Manufacturing Co. 411 N. 3rd St., Quincy, Ill.

Combustion Engineering Co. Raymond Pulverizer Div. 427 W. Randolph St., Chicago 8

Conn. & Co. 9 S. Marion St., Warren, Pa.

Continental Gin Co. (Batch) Birmingham, Ala.

Continental Sales Co. Box 212, Nevada, Iowa (Blend-O-Mixer)

Craddock Equipment Co. 1507 A. St., Wilmington, Del.

J. H. Day Co. Cincinnati 12

Davidson-Kennedy Co. 1090 Jefferson, SW, Atlanta, Ga.

Delta Manufacturing Co. 1414 Jackson St., Sioux City, Ia.

Eastern Industries Inc. Hamden 14, Conn.

Entoleter, Inc., Div. of American Mig. Co.

Box 904, New Haven, Conn.

Falcon Manufacturing Div., First Machinery Corp. 211 Tenth St., Brooklyn 15

Fertilizer Engineering & Equip. Co. Inc. Green Bay, Wisc.

Gifford-Wood Co. 420 Lexington Ave., New York

Gruendler Crusher & Pulverizer Co., 2915 N. Market St., St. Louis 6, Mo.

B. F. Gump Co. 1338 S. Cicero Ave., Chicago

Industrial Process Engineers 8 Lister Ave., Newark, N. J.

Inglett Dev. & Engineering Assoc. P. O. Box 177, Augusta, Ga.

Intl. Eng. Co. 1145 Bolander St., Dayton 1, O

C. S. Johnson Co. Champaign, Ill. Johnson-March 3018 Market St., Philadelphia (Verticone conditioner)

Link Belt Co. 307 N. Michigan Ave., Chicago 1

Mixing Equipment Co. 185-N Mt. Read Blvd., Rochester, N.Y.

Munson Mill Machinery Co. 210 Seward Ave., Utica, N. Y.

O'Brien Industrial Equipment Co. 1596 Hudson Ave., San Francisco 24, Calif. (Continuous Insecticide Blender)

Paterson-Kelley Co. East Stroudsburg, Pa.

A. E. Poulsen Co. 2341 E. 8th St., Los Angeles 21

Prater Pulverizer Co. 1829 S. 55th Ave., Chicago

Rapids Machinery Co. 867 11th St., Marion, Ia.

Read Standard Division York, Pa.

George C. Rodgers Co., Inc. 2401 Third Ave., New York, 51

A. J. Sackett & Sons 1737 S. Highland St., Baltimore

Sprout, Waldron & Co. 7 Logan St., Muncy, Pa.

Schutz-O'Neil Co. 311 Portland Ave., Minneapolis 15, Minn.

Scottdel, Inc. Swanton, O.

Stedman Foundry & Machine Co. Aurora, Ind.

Sturtevant Mill Co. 123 Clayton St., Boston 22

Superweld Corp. 6840 Vineland Ave., North Hollywood, Calif. (Ribbon mixers)

Young Machinery Co. Muncy, Pa.

John Williamson & Sons 666 W. Putnam Dr., Whittier, Calif.

Worthington Corp. S. Second St., Plainfield, N.J.

MITICIDES

Ortho Div., California Chemical Co. Richmond, Calif. (Mitox, Phosphamidon)

Chemagro Corp. N. Mall, Willow Lane, Richmond 30, Va. (Guthion)

Diamond Alkali Co. 300 Union Comm. Bldg., Cleveland, 14 (Ovex)

E. I. du Pont de Nemours & Co. Wilmington, Del. (FPN.300)

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y. (Chlombenzilate) General Chemical Div.
Allied Chemical Corp.
40 Rector St., N. Y. 6

Hercules Powder Co. 900 Market St., Wilmington 99 (Delnay)

Niagara Chemical Div., FMC Middleport, N. Y. (Tedion, Ethion, Phostex)

Rohm & Haas Co. Washington Sq., Philadelphia 5 (Kelthane)

Stauffer Chemical Co. 380 Madison Ave., New York 17 (Trithion)

NEMATOCIDES

American Potash & Chem. Corp., Eston Div.

3000 West Sixth St., Los Angeles 54 (Methyl Bromide, Ethylene Dibromide)

Dow Chemical Co. Midland, Mich. (Dorlone, Ethylene Dibromide, Methyl Bromide)

Diamond Alkali Co. 300 Union Comm. Bldg., Cleveland, 14 (PRD)

E. I. du Pont de Nemours & Co. Wilmington, Del. (VPM)

Great Lakes Chemical Corp. 500 Fifth Ave., New York 36 (Methyl Bromide)

Kolker Chemical Corp. 600 Doremus Ave., Newark 5, N. J. (Methyl Bromide)

Shell Chemical Corp. 460 Park Ave., New York 6 (Nemagon, D-D)

Stauffer Chemical Co. 380 Madison Ave., New York, 7 (Vapam)

Union Carbide Chemicals Co. Div., Union Carbide Corp. 30 E. 42nd St., New York 17 (Mylone)

Virginia-Carolina Chemical Co. 401 E. Main St., Richmond, Va. (V-C 13)

NITRIC ACID

American Cyanamid Co. Industrial Chemicals Div. 30 Rockefeller Plaza, New York

E. I. du Pont de Nemours & Co. Wilmington, Del.

Escambia Chemical Corp. 3330 Peachtree Rd., N.W. Atlanta 5, Ga.

General Chem. Div., Allied Chem. Corp.

40 Rector St., New York 6

Monsanto Chemical Co. 1700 2nd St., St. Louis 24, Mo.

Nitrogen Solutions

DRI-SOL

Grades range from 24 % ammonia and 76 % ammonium nitrate to 50 % ammonia and 50 % ammonium nitrate

COMMERCIAL SOLVENTS CORPORATION

260 Madison Ave., New York 16 See advertisement on Page 27

Sohio Chemical Co. PO Box 628, Lima, O.

Spencer Chemical Co. Dwight Bldg., Kansas City, Mo.

NITROGEN MATERIALS

LIQUIDS
Anhydrous Ammonia, and Solutions

Alabama By-Products Corp. PO Box 354, Birmingham, Ala. (anh. amm., N. solns.)

American Cyanamid Co. Princeton, N. J. (anh. amm., N. solns.)

Armour Agricultural Chem. Co. Atlanta, Ga. (N. soln: gnh. amm.)

Atlantic Refining Co. 260 S. Broad St., Philadelphia (anh. amm.)

Collier Carbon & Chemical Corp. 714 W. Olympic Blvd., Los Angeles

Columbia Southern Chemical Corp. Div. of Pittsburgh Plate Glass 632 Fort Duquesne Blvd., Pittsburgh 22 (anh. amm.)

Commercial Solvents Corp. 260 Madison Ave., N. Y. 16 (anh. amm., N. solns., aqua amm.)

Dow Chemical Co. Midland, Mich. (anh. amm.)

E. I. du Pont de Nemours & Co. Industrial & Biochemicals Dept. Wilmington 98, Del. (N. solns.)

Escambia Chemical Corp. 3330 Peachtree Rd., N.W. Atlanta 5, Ga. (anh. amm., N. solns.)

Grace Chemical Co.

Home Federal Bldg., Memphis
(anh. amm., amm. solns.)

Hercules Powder Co. 900 Market St., Wilmington, 99 (anh. amm.)

Intl. Commodities Corp.
11 Mercer St., New York 13
(N. solns)

John Deere Chemical Co. Pryor, Okla. (anh. amm., urea, urea-ammonia solns.)

Nitrogen Materials

- urea prills
- crystal urea
- urea solutions
- anhydrous ammonia

W. R. GRACE & CO.

147 Jefferson Ave.

Memphis 3, Tenn.

See advertisement on Page 4

NITROGEN (Liquids) (Contd.)

Mid-South Chemical Corp. 1222 Riverside, Memphis, Tenn.

Monsanto Chemical Co. 1700 2nd St., St. Louis 24, Mo. (anh. amm.)

Nitrogen Div., Allied Chem. Corp. 40 Rector St., N. Y. 6 (anh. amm., N. solns.)

Northern Chemical Industries, Inc. Totmon Bldg., Baltimore 2 (anh. amm., N. solns.)

Olin Mathieson Chemical Corp. Little Rock, Ark. (anh. amm., amm. sulfate, amm. phosphate, nitrate of soda)

Phillips Bros. Chemicals 10 Columbus Circle, N. Y. 19 (N. soln)

Phillips Chemical Co.
Adams Bldg., Bartlesville, Okla.
(anh. cmm., N. Solns.)

Sinclair Petrochemicals, Inc. 600 5th Ave., N. Y., 20 (anh. amm., N. solns., equa amm.)

Smith-Douglass Co. Norfolk, Va. (aqua amm., anh. amm.)

Sohio Chemical Co. PO Box 628, Lima, O. (anh. amm., N. solns., aqua amm.)

Spencer Chemical Co.
Dwight Bldg., Kansas City 5, Mo.
(anh. amm., N. solns., aqua amm.)

Belgian

UREA PRILLS

46% Nitrogen Guaranteed

H. J. BAKER & BRO. Inc.

733 Third Ave., New York 17

See advertisement on Page 116

Southern Nitrogen Co. PO Box 246, Savannah, Ga.

High Analysis Urea-Ammonium Nitrate Fertilizer

UN-32

HERCULES POWDER CO.
Wilmington, Delaware

See advertisement on Page 112

Standard Oil Co. (Indiana) 910 S. Michigan Ave., Chicago, 5 (anh. amm., N. solns.)

Sun Oil Company 1600 Walnut St., Philadelphia (anh., amm.)

Texaco, Inc. 135 E. 42nd St., New York 17 (anh. amm., N. solns., aqua amm.)

U.S. Industrial Chemicals Co. 99 Park Ave., N. Y., 16 (anh. amm., N. solns., aqua amm.)

SOLIDS — Prills, Powders, Granules

Alabama By-Products Corp. PO Box 354, Birmingham, Ala. (amin. sulfate)

American Cyanamid Co.
Princeton, N. J.
(amm. sulfate, amm. nitrate, urea,
calcium cyanamide)

Armour Agricultural Chem. Co. Atlanta, Ga. (amm. nitrate)

Atkins, Kroll & Co. 417 Montgomery St., San Francisco (urea, calcium nitrate)

H. J. Baker & Bro. 733 3rd Ave., New York 17 (amm. sulfate, ca. amm. nitrate, tankcae, DAP)

Bradley & Baker
155 E. 44th St., N. Y.
(Manufacturer's agents, importers of amm. sulfate, amm. nitrate, urea)

Central Resources Corp. 120 Wall St., New York 5

Commercial Solvents Corp. 260 Madison Ave., N. Y. 16 (amm. nitrate)

NITROGEN PRODUCTS

- Aqua Ammonia
- Anhydrous Ammonia
- Nitrogen Solutions
- Benzene Toluene

TEXACO INC.

Petrochemicals Sales Div. 135 E. 42nd St., New York 17

See advertisement on Page 124

NITROGEN MATERIALS

Arcadian N Solutions
Uran and Feran Solutions
Ammonia Liquor © N-Dure
Ammonium Nitrate © Urea
Sulphate of Ammonia © A-N-L
Nitrana © Urana © Durana © U-A-S

NITROGEN DIVISION Allied Chemical Corp. 40 Rector St., New York 6

See advertisement on Pages 35-38

Escambia Chemical Corp.
3330 Peachtree Rd., N.W.
Atlanta 5, Ga.
(cmm. nitrate)

Ford Motor Co. 3001 Miller Rd., Dearborn, Mich. [DAP (21-53-0)]

Grace Chemical Co. Home Federal Bldg., Memphis (urea)

Hercules Powder Co. 900 Market St., Wilmington 99, Del. (urea)

Hydrocarbon Products Co. 500 Fifth Ave., New York 18

Interlake Iron Corp.
Union Commerce Bldg., Cleveland, 14
(amm. sulfate)

Intl. Commodities Corp.

11 Mercer St., New York 13 (urea, amm. nitrate)

International Minerals & Chemical Corp. Skokie, Ill. (DAP)

Int. Ore & Fertilizer Corp.
500 Fifth Ave., New York 36

John Deere Chemical Co. Pryor, Okla. (Urea)

Koppers Co. Pittsburgh 19 (amm. sulfate)

Lebanon Chemical Corp. Lebanon, Pa. (activated sludge)

Monsanto Chemical Co. 1700 S. 2nd St., St. Louis 24, Mo. (amm. nitrate)

AMMONIUM SULPHATE AQUA AMMONIA

NITROGEN PRODUCTS, INC.

National Bank Building New Brunswick, N. J.

See advertisement on Page 8

88

R. S. Mueller Co. Garrett Bldg., Baltimore 2, Md. (amm. sulfate)

Nitrogen Div., Allied Chem. Corp. 40 Rector St., New York, 6 (amm. sulfate, amm. nitrate, urea)

Nitrogen Products, Inc.
National Bank Bldg., New Brunswick,
N. J.
(amm. sulfate)

Northern Chemical Industries, Inc. Totman Bldg., Baltimore 2, Md. (amm. sulfate, amm. nitrate)

Olin Mathieson Chemical Corp. Plant Food Div. Little Rock, Ark. (amm. sulphate, amm. nitrate, urea)

Phillips Bros. Chemicals Co. 10 Columbus Circle, N. Y. 19 (amm. sulphate, urea)

Phillips Chemical Co.
Adams Bldg., Bartlesville, Okla.
(amm. sulfate, amm. nitrate)

Republic Steel Corp. Republic Bldg., Cleveland, 1 (amm. sulfate)

Smith-Douglass Co., Inc. 5100 Virginia Beach Blvd., Norfolk, Va. (tankage)

Schio Chemical Co. PO Box 628, Lima, O. (urea, amm. nitrate)

Spencer Chemical Co.
Dwight Bldg., Kansas City 5, Mo.
(amm. nitrate)

Southern Nitrogen Co. PO Box 246, Savonnah, Ga. (amm. nitrate, urea)

Southwest Potash Co. 1270 Ave. of The Americas, New York, N. Y. (potassium nitrate)

SunOlin Chemical Co. Claymont, Del. (Urea)

United Fertilizer Co. Carrollville, Wisc. (tankage)

United States Steel Corp. 525 William Penn Place, Pittsburgh 30 (amm. sulfate-granular)

U. S. Pipe & Foundry Co. 2300 First Ave. N., Birmingham 2, Ala. (amm. sulfate)

Woodward & Dickerson, Inc. 1400 S. Penn Square, Philadelphia, 2 (Brokers—amm. sulfate, ammoniates, tankage)

NOZZLES

Bastian Blessing Co. 4201 W. Peterson Ave., Chicago 46

Bete Fog Nozzle Co. Greenfield, Mass.

Delavan Mig. Co. West Des Moines, Iowa

Dezurik Corp. Sartell, Minnesota

FERTILIZER MATERIALS PESTICIDES

Calcium nitrate • Urea, peletted Foliar spray urea

Importers • Exporters

ATKINS, KROLL & CO. LTD. 500 Fith Ave., New York 36, N. Y.

See advertisement on Page 132

Grinnell Co. 260 W. Exchange St., Providence, R. I.

Henry Valve Co. 3215 North Ave., Melrose Park, Ill.

Minneapolis Honeywell Regulator Co. 5800 N. 7th St., Philadelphia 44

Monarch Manufacturing Works. Inc. 3406 Miller St., Philadelphia 34

OPW-Jordan Corp. 6013 Wiehe Rd., Cincinnati 13, Ohio

Spraying Systems Co. 3230 Randolph St., Bellwood, Ill.

Squibb Taylor Inc. 1213 S. Akard St., Dallas, Texas

Tokheim Corp. Fort Wayne, Ind.

PACKAGING MACHINERY — See Bag Packing

PACKAGING MATERIALS

Olin Mathieson Co.
Packaging Division
Baltimore 3, Md.
(folding cartons)

Packaging Materials Corp. 104 E. 40th St., New York 16 (carliners, corrugated)

PAILS; Steel - See also Drums

American Can Co. 100 Park Ave., N. Y.

Bennett Industries 122 Washington St., Peotone, Ill.

Central Can Co. 3200 S. Kilbourn Ave., Chicago 23, Ill.

Continental Can Co. 100 E. 42nd St., N. Y.

DELAVAN

Nozzles and Accessories

Make good spraying equipment better

DELAVAN MFG. CO. West Des Moines, Iowa

See advertisement on Page 49

CARLINER

Pillo-Pak Solid-Ribbed

Packaging Materials Corp. 104 E. 40th St., N. Y. 16

See advertisement on Page 133

Eastern Can Co. Keap St. & Kent Ave., Bklyn.

Fein's Tin Can Co. Bush Terminal, Brooklyn

Gueder, Paeschke & Frey Co. 324 N. 15th St., Milwaukee

Inland Steel Container Co. 30 W. Monroe, Chicago

Jones & Laughlin Steel Corp. 3 Gateway Center, Pittsburgh

National Steel Barrel Co. 3860 E. 91st St., Cleveland

Rheem Mig. Co. 1707 Edgar Rd. W., Linden, N. J.

Stern Can Co. 71 Locust St., Boston 25

U. S. Steel Prod. Div. 30 Rockefeller Plaza, New York 20

Vulcan Containers, Inc. Bellwood, Ill.

Vulcan Steel Container Co. 3315 N. 35th Ave., Birmingham, Ala.

PAN FILTER

Dorr-Oliver, Inc. Stamford, Conn. (vacuum filter for phosphoric acid)

PARADICHLOROBENZENE

Columbia Southern Chemical Corp.
1 Gateway Center, Pittsburgh

Dow Chemical Co. Midland, Mich.

E. I. du Pont de Nemours & Co. Wilmington, Del.

Hooker Chemical Corp. 603 Buffalo Ave., Niagara Falls, N. Y.

Mallinckrodt Chemical Works 3600 Second St., St. Louis

Monsanto Chemical Co. 1700 S. Second St., St. Louis

Solvay Process Div., Allied Chem. Corp. 61 Broadway, New York 6

PESTICIDES — See Insecticides

PHENOTHIAZINE

American Cyanamid Co.
30 Rockefeller Plaza, New York

PHOSPHATE ROCK

from 77% BPL to 72% Triple Super Phosphate Phosphoric Acid

AMERICAN CYANAMID CO.
Princeton, N. J.

See advertisement on Page 12

Basic Plant Goods

POTASH PHOSPHORUS NITROGEN

sales agents

BRADLEY & BAKER 155 E. 44th St., New York City

See advertisement on Page 55

PHOSPHATES

ARMOUR AGRICULTURAL CHEMICAL CO.

Atlanta, Georgia

See advertisement on Page 103

DIAMMONIUM PHOSPHATE

21-53-0

100% Water Soluble

FORD MOTOR COMPANY
Steel Division

3001 Miller Rd., Dearborn, Mich.

See advertisement on Page 152

P.O.

Nitrogen Compounds

K₂O

CENTRAL RESOURCES CORP. 120 Wall St., New York 5

See advertisement on Page 144

American Firstoline Corp. 855 Ave. of Americas, New York 1

Atomic Basic Chemicals Corp. PO Box 10855, Pittsburgh, Pa.

E. I. du Pont de Nemours Co. Wilmington, Del.

pH METERS

Analytical Measurements, Inc. 585 Main St., Chatham, N. J.

Beckman Instruments, Inc. 2500 Fullerton Ave., Fullerton 1, Calif.

PHOSPHATE MATERIALS (phosphate rock, triple superphosphate, superphosphate)

American Agricultural Chem. Co. 100 Church St., New York 7 (rock, super)

American Cyanamid Co. Princeton, N. J. (rock, triple super)

Armour Agricultural Chem. Co. Atlanta, Ga. (rock, triple super)

H. J. Baker & Bro. 733 3rd Ave., New York 17 (phosphate, triple, DAP)

Bradley & Baker 155 E. 44th St., N. Y. 17 (triple, DAP)

Central Resources Corp. 120 Wall St., New York 5

Coronet Phosphate Co.,
Div. Smith Douglass Co., Inc.
Norfolk 1, Va.
(rock)

Davison Chemical Div., W. R. Grace & Co. Baltimore 3, Md. (super, triple super, rock)

Ford Motor Co. 3001 Miller Rd., Dearborn, Mich. (DAP, 21-53-0)

Hooker Chemical Corp., Phosphorus Div. Jeffersonville, Ind. (phosphatic solutions)

Intl. Commodities Corp.

11 Mercer St., New York 13 (rock, triple, super)

Intl. Minerals & Chemical Corp. Skokie, Ill. (triple, super)

Intl. Ore & Fertilizer Corp. 500 Fifth Ave., New York 36 (super, rock)

Northern Chemical Industries, Inc. 210 E. Redwood St. Baltimore 2, Md. (super)

Olin Mathieson Chemical Corp. Little Rock, Ark. (super, conc. super, amm. phosphate)

HI-FLO

Gran-U-Lated Triple Superphosphate

Consistent Uniformity

DAVISON CHEMICAL DIV., W. R. Groce & Co. Baltimore 3, Md.

See advertisement on Page 68

Phillips Bros. Chemicals 10 Columbus Circle, NYC (super)

Phillips Petroleum Co. Bartlesville, Okla. (triple super)

Planters Fertilizer & Phosphate Co. Charleston Heights, S. C. (super)

Smith-Douglass Co., Inc. 5100 Virginia Beach Blvd., Norfolk, Va. (rock)

Swift & Co.

Bartow, Fla.

(rock, triple super)

U. S. Phosphoric Products Div., Tennessee Corp. Box 3296, Tampa 1, Fla. (triple super, DAP)

Western Phosphates, Inc. distributor: Wilson & Geo. Meyer & Co. San Francisco (triple super)

PHOSPHORIC ACID

American Agricultural Chem. Co. 100 Church St., New York 7

American Cyanamid Co. Princeton, N. J.

Bradley & Baker 155 E. 44 St., New York 17, N. Y.

Bunker Hill Co. 660 Market St., San Francisco 4

FMC Mineral Products Div. 161 E. 42rd St., New York 17

General Chemical Div.
Allied Chemical Corp.
40 Rector St., New York 6

FERTILIZER RAW MATERIALS

Phosphate rock, superphosphate ammonium sulfate, polash, urea, ammonium nitrate, sulfur, ammonium phosphates, minor elements

complete fertilizer mixture to your order

International Commodities Corp.

11 Mercer St., New York 13, N. Y. See advertisement on Page 34

Granular

TRIPLE SUPERPHOSPHATE

46% available phosphoric acid

U. S. Phosphoric Products
Tampa, Florida

See advertisement on Page 9

Hooker Chemical Corp., Phosphorus Div. Jeffersonville, Ind.

Davison Chemical Div., W. R. Grace & Co.
Baltimore 3, Md.

A. R. Maas Chemical Co. Div. Victor Chemical Works 4750 Ardine St., South Gate, Calif.

Monsanto Chemical Co. St. Louis, Mo.

Olin Mathieson Chemical Corp. Little Rock, Ark.

Shea Chemical Corp.
P. O. Box 267, Marysville, Ohio

Smith-Douglass Co. Norfolk, Va.

Tennessee Corp. 619 Grant Bldg., Atlanta

U.S. Industrial Chemicals Co. 99 Park Ave., New York 16

U. S. Phosphoric Products Div. Tennessee Corp. Box 3269, Tampa 1, Fla.

Victor Chemical Works
Div. of Stauffer Chemical Co.
155 N. Wacker Dr., Chicago 6

Western Phosphates Inc. distributor: Wilson & Geo. Meyer & Co. San Francisco

PLANT GROWTH REGULATORS

Abbott Laboratories 14th and Sheridan Ave., N. Chicago (Gibberellic Acid)

Eli Lilly & Co. 740 S. Alabama St., Indianapolis 6 (Gibberellic Acid)

FERTILIZER RAW MATERIALS

Phosphate rock, superphosphate, mixed fertilizers, potash, sulphur, nitrogenous fertilizers, mineral supplements, insecticides

International Ore & Fertilizer Corp. 500 Fifth Ave., New York 36

See advertisement on Page 6

Fine Organics Inc. 205 Main St., Lodi, N. J. (Naphthalenegcetic Acid)

General Chemical Div.

Allied Chemical Corp. 40 Rector St., New York 6

Heyden-Newport Chemical Corp. 342 Madison Ave., New York (maleic hydrazide)

Merck & Co., Chemical Division Rahway, N. J. (Indole Butyric Acid, Gibberellic Acid)

Miller Products Co. 7737 N.E. Killingsworth, Portland 18, Oregon (Naphthalene Acetic Acid)

S. B. Penick & Co. 4161 Beck Ave., St. Louis 16 (Gibberellic Acid)

Chas. Pfizer & Co. 630 Flushing Ave., Brooklyn 6 (Gibberellic Acid)

Texaco, Inc. 332 S Michigan Ave., Chicago 4 (Naphthalene Acetic Acid)

U. S. Rubber Co., Naugatuck Div. Naugatuck, Conn. (Maleic Hydrazide, Phthalamic Acid)

Velsicol Chemical Corp. 330 E. Grand Ave., Chicago 11 (Gibberellic Acid)

POTASH

American Potash & Chem. Corp. 3030 W. 6th St., Los Angeles, 54

Berkshire Chemicals Inc. 630 3rd Ave., N. Y. 17 (Nitrate of Potash)

H. J. Baker and Bro. 733 3rd Ave., New York 17

Bonneville, Ltd. Salt Lake City, Utah

Bradley & Baker 155 E. 44th St., New York

Central Resources Corp. 120 Wall St., New York 5

duVal Sulphur & Potash Co. exclusive distributor: Ashcratt Wilkinson Co. Trust Co. of Georgia Bldg., Atlanta

French Potash & Import Co. 51 East 42nd SSt., New York 17

Intl. Commodities Corp.
11 Mercer St., New York 13

Intl. Ore & Fertilizer Corp. 500 5th Ave., New York, 36

Intl. Minerals & Chem. Corp. Skokie, Ill.

Potash Import & Chemical Corp. 285 Madison Ave., New York 17

Southwest Potash Corp. 1270 6th Ave., New York, N. Y.

Potash Company of America 630 Fifth Ave., New York 20

U. S. Borax 50 Rockeleller Plaza, New York, 20

IMC Total Service

A single source for your full line of raw materials

INTERNATIONAL MINERALS
& CHEMICAL CORP.
Old Orchard Rd., Skokie, III.

See advertisement on Pages 52-53

HIGH-K

Muriate of Potash

In Standard, Coarse, and Granular grades.

SOUTHWEST POTASH CORP.

1270 Ave. of Americas, New York 20, N. Y.

See advertisement on Page 46

Muriate of Potash

standard and granular types
SULPHUR

lump and molten

ASHCRAFT-WILKINSON CO.

Atalnta, Ga.

See advertisement on Page 70

POTASH

60% Standard Muriate 60% Granular Muriate 60% Coarse Muriate Sulfate of Potash 99.9% KCI

Potash Company of America 630 Fifth Ave., New York 20

See advertisement on Page 31

POTASH

- HiGrade Muriate (62-63%)
- HiGrade Granular Muriate (62-63%)
- Granular Muriate (60%)

U. S. BORAX 50 Rockefeller Plaza New York 20

PRIVATE BRANDS — See Custom Packaging

PROTECTIVE CLOTHING — See Clothing

PULVERIZERS - See Mills

PUMPS

Aldrich Pump Co. Pine St., Allentown, Pa.

Aurora Pump Div. Aurora, Ill.

Buffalo Pumps 524 Broadway, Buffalo

Crown Mig. Co. Waterloo, Iowa

Dean Hill Pump Co. 4020 E. 16th St., Indianapolis, Ind.

Deming Co. Salem, Ohio

Dorr-Oliver, Inc. Stamford, Conn.

Duriron Co. 425 N. Findley, Dayton, O.

Goulds Pumps, Inc. Seneca Falls, N. Y.

Hydro-Dynamics Research Industries 115 N. Cicero Ave., Chicago 44, Ill.

Hypro Engineering Co. 700 39th Ave., N.E., Minneapolis, Minn.

Johnston Pump Co. Pasadena, Calif.

D. H. Krug Co. Madison, S. Dak.

Marine Products Co. 515 Lycaste Ave., Detroit 14

Proportioneers, Inc. Harris Ave., Providence, R. I.

Protek Specialty Co.
Box 194, Bellaire, Texas
(hand pump)

Roper Co. Kankakee, Ill.

Tryco Manufacturing Co. Decatur, Ill.

Warren Pumps, Inc. Warren, Mass.

Viking Pump Co. Cedar Falls, Ia.

Worthington Corp. Harrison, N. J.

PYRETHRUM — See Insecticides

REBUILT MACHINERY

Brill Equipment Co. 35 Jabez St., Newark S, N. J.

Chemical & Process Machinery Corp. 52 Ninth St., Brooklyn 19

Consolidated Products Co. 64 Bloomfield St., Hoboken, N. J.

WARFARIN DETHMOR®

Anti Coagulant Rodenticide rats and mice never build tolerance

S. B. PENICK & COMPANY 4161 Beck Ave., St. Louis 16, Mo.

See advertisement on Page 22

First Machinery Corp. 209 Tenth St., Brooklyn 15

R. Gelb & Sons, Inc. Union, N. J.

Machinery & Equipment Corp. 91-93 NJ Railroad Ave., Newark 5

Perry Equipment Corp. 1428 N. 6th St., Phila. 22

Stein Equipment Co. 107 Eighth St., Brooklyn 15

Union Standard Equipment Co. 318-322 Lafayette St., N. Y. 12

REFRACTORY PRODUCTS

Plibrico Co. 1807 Kingsbury, Chicago

REPELLENTS

Cowles Chemical Co. 7016 Euclid Ave., Cleveland 3 (Diethyl Toluamide)

Fairfield Chemicals Div., FMC 441 Lexington Ave., New York 17 (Crag)

Glenn Chemical Co. 2735 N. Ashland Ave., Chicago 14 (Tabatrex)

R. W. Greeff & Co. 10 Rockefeller Plaza, New York 20 (Diethyl Toluamide)

Henry Town Laboratories Madison, Wisc. (Pestrin)

Hercules Powder Co. 900 Market St., Wilmington 99 (Diethyl Toluamide)

McLaughlin Gormley King Co. 1715 S.E. 5th St., Minneapolis (MGK Repellent)

RESPIRATORS - See Masks

RODENTICIDES

Amchem Products Inc. Ambler, Pa. (Fumerin)

American Cyanamid Co. Princeton, N. J. (Cyanides)

Hooker Chemical Corp. Niagara Falls, N. Y. (Zinc Phosphide) Inland Chemical Corp. 415 Lexington Ave., New York

Motomco, Inc. Terminal Ave., Clark, N. J. (Pival, Pivalyn)

S. B. Penick & Co. 4161 Beck Ave., St. Louis 16 (Worfarin)

Prentiss Drug & Chemical Co. 101 West 31st St., New York 1 (Warfarin)

ROTENONE — See Insecticides

RYANIA - See Insecticides

SABADILLA — See Insecticides

SCALES — See also Bag Packing and Weighing Machinery

Atlanta Utility Works
Atlanta, Ga.

Allen Scale Co. 774 Murphy Ave., S. W., Atlanta 3

BIF Industries 536 Harris Ave., Providence, R. I.

Bonded Scale & Machine Co. 2176 S. 3rd St., Columbus 7, Ohio

Burrows Equipment Co. 1316-AC Sherman Ave., Evanston, Ill. (Portable)

Exact Weight Scale Co. 941 West 5th Ave., Columbus 8

Kraft Bag Div., St. Mary's Kraft Corp., Subsidiary of Gilman Paper Co. 111 West 50th St., New York 20, N. Y.

Richardson Scale Co. 668 Van Houten Ave., Clifton, N. J.

Stedman Foundry & Machine Co.
Aurora, Illinois

Thayer Scale & Engr. Corp. Pembroke, Mass.

Toledo Scale Co. Toledo, Ohio

Weighing and Controls
Industrial Park, Hatboro, Pa.

Winslow Governor Std. Scale Works Winslow & 25th St., Terre Haute, Ind.

SCREENING-SIFTING-CLASSIFY-ING EQUIPMENT

Atlanta Utility Works
East Point, Ga.

Bauer Bros. Co. 1825 Sheridan Ave., Springfield, Ohio

Bonded Scale & Machine Co. 2176 S. 3rd St., Columbus 7, Ohio

Buell Engineering Corp. 123 William St., New York

Sinclair

- Pesticide Solvents
- Anhydrous Ammonia
- Aqua Ammonia
- **Ammonium Nitrate Solutions**
- Sulfur
- Nitrogen Fertilizer Solutions

SINCLAIR PETROCHEMICALS 600 Fifth Ave., N. Y. 20, N. Y.

See advertisement on Page 41

Cleveland Vibrators Co. 2828 Clinton St., Cleveland

Davidson Kennedy Co. Box 97, Station D, Atlanta

Dorr-Oliver, Inc. Stamford, Conn.

B. F. Gump Co. 1338 S. Cicero Ave., Chicago

Hewitt Robins Inc. Stamford, Conn.

Inglett & Co. P. O. Box 3425, Augusta, Ga.

Kennedy-Van Saun Mig. & Eng'g Corp. 405 Park Ave., N. Y. 22

Ludlow Saylor Wire Cloth Co. 634 S. Newstead Ave., St. Louis, Mo.

Simplicity Engineering Co. Durand, Mich.

Southwestern Engineering Co. 4800 Sante Fe Ave., Los Angeles 58

Stephens-Adamson Monfacturing Co.

Stedman Foundry & Machine Co.

Sturtevant Mill Co. 123 Clayton St., Boston, 22

W. S. Tyler Co. 3615 Superior St., Cleveland 14

Universal Vibrating Screen Co. Racine, Wis.

Young Machinery Co. Muncy, Pa.

SEED TREATMENTS — See Fungicides

SEPARATORS, Magnetic

Bauer Bros. Co. 1825 Sheridan Ave., Springfield, Ohio

Dings Magnetic Separator Co. 4711 W. Electric Av., Milwaukee 46

Eriez Míg. Co. Erie 6, Pa.

Magni-Power Co. Wooster, Ohio

SODIUM MOLYBDATE — See Trace Elements

ESPESOL 5

aromatic solvent for insecticide formulation

SIGNAL OIL & GAS CO. **Houston Division**

Box 5008 Houston 12, Tex.

See advertisement on Page 59

SOIL FUMIGANTS—See Nemato-

SOIL TESTING KITS

Norwalk, Ohio

Steller Research Co. Box 1071, Sonta Cruz, Calif.

Sudbury Laboratory S. Sudbury, Mass.

SOLVENTS (for insecticides)

American Mineral Spirits Co. 200 S. Michigan Ave., Chicago 4

Amoco Chemicals Corp. Prudential Plaza, Chicago 1 (Panasol)

Anderson-Prichard Oil Corp. Liberty Bank Bldg., Oklahoma City 2, (Stod-Sol, Apco solvent)

Cosden Petroleum Corp. Big Spring, Tex. (Xylene, Aromatic Solvents)

Crowley Tar Products Co. 271 Madison Ave., New York 16 (Xylol)

Delhi-Taylor Oil Corp. Fidelity Union Tower, Dallas, Tex.

Esso Standard Oil Co. 15 West 51st St., New York 19

Neville Chemical Co. Neville Island, Pittsburgh 25

Edwards Laboratory

LaMotte Chemical Products Co. Chestertown, Md.

Bound Brook, N. I. Colloidal Products Corp.

Antara Chemicals Div., General Aniline & Film Corp. 435 Hudson St., New York 14

Armour & Co., Adhesives Div. 1355 W. 31st St., Chicago 9

Chipman Chemical Co.

Penn Industrial Chem. Corp.

Signal Oil & Gas Co.,

Sinclair Petrochemicals

600 Fifth Ave., New York Skelly Oil Co. 605 W 47th St., Kansas City 41

Box 5008, Houston 12, Texas (Espesol 5)

P. O. Box 18. Houston, Texas

SPRAY NOZZLES — See Valves,

SPREADERS-STICKERS — AD-

Penola Oil Co. 15 West 51st St., New York 19

Richfield Oil Corp. 555 S. Flower St., Los Angeles 17 (Toxisol PX)

Clairton, Pa.

(Penola HAN)

(Skellysolve)

Nozzles

JUVANTS

Tenneco Oil Co.

11 Gate 5 Rd., Sausalito, Calif.

E. I. du Pont de Nemours & Co. Wilmington, Del.

Florida Agricultural Supply Co. P. O. Box 658, Jacksonville, Fla.

General Chemical Div., Allied Chemical Corp. 40 Rector St., New York 6 (Plyac)

Holloway-Sucro Chemicals Corp. 57-02 48th St., Maspeth 78, N. Y.

Marathon Corp. Menasha, Wis. (Marasperse)

National Aniline Div., Allied Chemical Corp. 40 Rector St., New York 6 (Nacconol)

Multi- Film SPRAY ADJUVANTS

Since 1920

COLLOIDAL PRODUCTS CORP.

Sausalito, California

See advertisement on Page 43

A new line of PETROCHEMICALS

- · benzene · toluene · xylene
- ortho-xylene ethyl-benzene · meta para xylene conr.

TENNECO OIL CO.

PO Box 18, Houston, Tex. See advertisement on Pages 100-101

SPREADERS (Contd.)

Pennsalt Mfg. Co. of Washington 2901 Taylor Way, Tacoma, Wash. (Penco Activator)

Process Chemicals Co. 1833 S. Dice Rd., Santa Fe Springs, Calif.

Rohm & Haas Co. Washington Sq., Philadelphia 5 (Triton)

Stepan Chemical Co.
Edens & Winnetka. Northfield, III.

A. E. Staley Mig. Co. Decatur, Ill. (Soybean Flour and Corn Starch)

Vanderbilt Co., R. T. 230 Park Ave., New York 17

Witco Chemical Co., Inc. 122 E. 42nd St., New York 17 (Emcols)

STORAGE (including Silos)

Marietta Concrete Corp. Marietta, O.

Edward S. Nelson Co. Clarksdale, Miss.

SULPHUR

du Val Sulphur & Potash Co. exclusive distributor: Ashcraft Wilkinson Co. Atlanta, Ga.

Flag Sulphur & Chemical Co. P. O. Box 5437, Tampa 5, Fla.

Freeport Sulphur Co. 161 E. 42nd St. N. Y., 17

Gulf Sulphur Co Houston, Texas

Intl. Ore & Fertilizer Corp. 500 Fifth Ave., New York 36

Jefferson Lake Sulphur Co. Whitney Bldg., New Orleans

Olin Mathieson Chemical Corp. Baltimore 3, Md.

Pan American Sulphur Co 609 Bank of the S.W. Bldg., Houston

Stauffer Chemical Co. 380 Madison Ave., N. Y. 17

Texas Gulf Sulphur Co. 75 East 45th St., N. Y. 17

Texas International Sulphur Co. Houston, Tex.

Trans-Jeff Chemical Corp. McMullen, Texas

SULFURIC ACID

American Agricultural Chem. Co. 100 Church St., New York 7

American Cyanamid Co. 30 Rocketeller Plaza, N. Y. 20

Dixon Chemicals Paulsboro, N. J.

General Chemical Div.
Allied Chemical Corp.
40 Rector St., New York 6

SULPHUR

Prompt

Molten

Sulphur

Deliveries

TEXAS GULF SULPHUR CO. 75 East 45th Street New York 17, N. Y.

See advertisement on 3rd Cover

W. R. Grace Co., Davison Chemical Div.

International Minerals & Chemical Corp. Skokie, Ill.

Monsanto Chemical Co. St. Louis 24, Mo.

Northern Chemical Industries Totman Bldg., Baltimore 2, Md.

Olin Mathieson Chemical Corp. Little Rock, Ark.

Planters Fertilizer & Phosphate Co. Charleston Heights, S. C.

Smith-Douglass Co. Norfolk, Va.

Stauffer Chemical Co. 380 Madison Ave., N. Y. 17

Tennessee Corp. 617-29 Grant Bldg., Atlanta

U.S. Industrial Chemicals Co. 99 Park Ave., N. Y. 16

SURFACTANTS — See Wetting Agents

SYNERGISTS

Fairfield Chemicals Div., FMC 441 Lexington Ave., New York 17

McLaughlin Gormley King Co. 1715 S. E. 5th St., Minneapolis

S. B. Penick & Co. 4161 Beck Ave., St. Louis 16

Prentiss Drug & Chemical Co. 101 West 31st St., New York 1

Give New Life to Old Tanks

FLEXI-LINER

Liner for Vertical and Horizontal Tanks

FLEXI-LINER CO.
P. O. Box 767, Pasadena, Calif.

See advertisement on Page 8

Aluminum Tanks for Nitrate Solutions

R. D. COLE MFG. CO. Newnan, Georgia

See advertisement on Page 121

TANKS

Abrasion & Corrosion Eng'g Co. Amarillo, Tex.

Arkansas Foundry Co. 1423 East 6th St., Little Rock, Ark.

J. B. Beaird Co., Inc. Clinton, Iowa

Birmingham Tank Co. Birmingham, Ala.

Butler Mig. Co. 7312 E. 13th St., Kansas City, Mo.

R. D. Cole Manufacturing Co. Newman, Ga.

Dallas Tank Co., Inc. 203 W. Commerce, Dallas 22, Texas

Flexi-Liner Co.

359 E. Main St., Decatur, Ill. (laminated plastic liners to convert mild steel or wood tanks for storage of corrosive liquids)

Flint Steel Corp. Box 3155, Memphis, Tenn.

Gates Rubber Co. Denver 17, Colo.

Lubbock Machine & Supply Co. P. O. Box 1589, Lubbock, Texas

Master Tank & Welding 1600 Singleton Blvd. Dallas, Tex.

Molded Fiber Glass Body Co. 3714 Ann Ave., Ashtabula, Ohio (fiber glass tanks)

Edward S. Nelson, Ltd. Clarksdale, Miss.

Puget Sound Fabricators Inc. 3670 E. Marginal Way, Seattle 4, Wash.

Claude B. Schneible Co. 2827 25th St., Detroit 16, Mich.

U. S. Rubber Co., 10 Eagle St., Providence, R. I. (flexible storage unit for liquid fertilizer)

Wendnagel & Co. 600 W. Cermak Rd., Chicago 16

TARPAULINS (for fumigation)

Hoosier Tarpaulin & Canvas Goods Co. 1302 W. Washington St., Indianapolis 6, Ind.

H. M. Sawyer & Son Co. Stanley St., Watertown, Mass.

U. S. Rubber Co. 1230 Ave. of Americas, N. Y.

FRITTED TRACE ELEMENTS

Six trace elements in fritted form

FERRO CORPORATION 4150 East 56 St., Cleveland 5, O.

See advertisement on Page 128

TESTING OF PESTICIDES (in the field)

Florida Field Trials
Box 356, Belle Glade, Fla.

Harris Laboratories 624 Peach St., Lincoln 2, Neb.

Trojan Laboratories
Box 353, San Lorenzo, Calif.

Dr. Wolf's Agricultural Labs. 2620 Taylor St., Hollywood, Fla.

TESTING — See Consultants

TRACE ELEMENTS (copper sulfate, zinc sulfate, manganous oxide, etc.)

Climax Molybdenum Co., Div. of American Metal Climax, Inc. 1270 Ave. of The Americas, N. Y. 20 (molybdenum)

American Limestone Co. Knoxville, Tenn. (zinc, magnesium, copper)

W. R. E. Andrews Co. 1505 Race St., Phila. 2 (copper, zinc, manganese)

Berkshire Chemicals Inc. 630 Third Ave., New York 17 (magnesium)

Calumet Div., Calumet & Hecla, 25 Calumet Ave., Calumet, Mich. (Copper)

Crown Zellerbach Corp. 231 Sansome St., San Francisco (iron)

Davies Nitrate Co.
118 Liberty St., N. Y. 6
(maganese, iron, copper, boron,

Eastman Chemical Products, Inc. Kingsport, Tennessee (monganese)

Ferro Corporation,
Agricultural Div.
4150 E. 56th St., Cleveland 5
(Fritted trace elements)

Geigy Agricultural Chemicals Saw Mill River Rd., Ardsley, N. Y.

Trace Elements

Chelated

NUTRAMIN

multiple water soluble blend containing manganese, iron, zinc, copper, boron, molybdenum

DAVIES NITRATE CO., INC. 118 Liberty St., New York 6

See advortisement on Page 117

Intl. Commodities Corp.
11 Mercer St., New York 13

Intl. Ore & Fertilizer Corp. 500 Fifth Ave, New York 36

Nutrilite Products, Inc. Buena Park, Calif. (iron, zinc, manganese)

Phelps Dodge Refining Corp. 300 Park Ave., New York 22 (copper)

Republic Chemical Co. 94 Beekman St., New York (copper oxide)

Tennessee Corp. 617-629 Grand Bldg., Atlanta, Ga. (iron, copper, zinc, manganese)

U. S. Borax
50 Rockefeller Plaza, N. Y. 20
(boron)

TRACTOR SHOVELS

Clark Equipment Co. 2463 Pipestone Rd., Benton Harbor, Mich.

Frank G. Hough Co. Libertyville, Ill.

Lessman Mig. Co. 2005 Easton Blvd., Des Moines, Ia.

Yale & Towne Mfg. Co. Philadelphia, Pa.

VALVES — NOZZLES

VIBRATORS — See Conveyors, Feeders

Agricultural Chemicals'

staff has done its best to compile an accurate, useful Buyers' Guide. — Still errors and omissions are bound to occur. We shall greatly appreciate it if readers will let us have suggestions for changes needed before publication of the 1962-63 Buyers' Guide. Send to:

AGRICULTURAL CHEMICALS Box 31, Caldwell, N. J.

Michigan

TRACTOR SHOVEL

CLARK EQUIPMENT CO. 2463 Pipestone Road Benton Harbor 6, Mich.

See advertisement on Page 33

WEED KILLERS — See Herbicides

WEIGHING MACHINERY — See Bag Packing, Weighing Machinery, also Scales

WETTING AGENTS

American Cyanamid Co. Princeton, N. I.

Antara Chemicals Div., General Aniline & Film Corp. 435 Hudson St., New York 14

Monsanto Chemical Co. St. Louis 24

National Aniline Div., Allied Chemical Corp. 40 Rector St., New York 6

Petrochemicals Co. 1825 E. Spring St. Long Beach 6, Calif.

Stepan Chemical Co. Edens & Winnetka, Northfield, Ill.

Ultra Chemical Works 2 Wood St., Paterson 4, N. J.

Witco Chemical Co., Inc. 122 E. 42nd St., New York

WIRE CLOTH

Ludlow Saylor Wire Cloth So. 634 S. Newstead Ave., St. Louis, Mo.

W. S. Tyler Co. 3615 Superior St., Cleveland 14

PETRO • WP

First Choice in Wetting Agents for Pesticides and Other Agricultural Powders

PETRO CHEMICALS CO. 420 Lexington Ave., N. Y. 17

APPLICATOR'S SECTION

AGRICULTURAL AIRCRAFT

American Airmotive Corp.
P. O. Box 187, Miami 48, Fla.
(NA-75 "composite" Stearman)

Auster Aircraft Ltd. Rearsby, Leicester, England (Workmaster, Agricola)

Bell Helicopter Corp. (helicopters)
P. O. Box 482, Fort Worth, Texas

CallAir, Inc. (A-5 & A-6) Afton, Wyo.

Champion Aircraft (Aeronca, Sky-Trac) Osceola, Wisc.

Clark Aircraft, Inc. (Ag-Biplane) P. O. Box 903, Marshall, Texas

De Havilland Aircraft Co. Ltd. Hatfield Aerodrome, Hatfield, Hertfordshire, England (Chipmunk MK23)

Fletcher Aviation Corp. (FU-24) Rosemead, Calif.

Grumman Aircraft Engineering Corp. Bethpage, L. I., N. Y. (Ag-Cat)

Hiller Aircraft Corp. (helicopters) 1350 Willow Road, Palo Alto, Calif.

Jackaroo Aircraft Ltd. (Jackaroo) Thruxton Aerodrome, Andover, Hants, England

Kellett Aircraft Corp.
Box 35, Willow Grove, Pa.
(Cropmaster autogiro)

Piper Aircraft Corp. (Pawnee) Lock Haven, Pa.

Rawdon Bros. Aircraft, Inc. 10412 E. Central Ave., Wichita, Kans. (Rawdon T-1)

Republic Aviation Corp., Helicopter Div. Farmingdale, L. I., N. Y. (Alouette II helicopter)

Sikorsky Aviation Division, United Aircraft Corp. (helicopters) Stratford, Conn.

Simpson & Whitney Aviation (Airplane) Box 141, Liberal, Kans.

Snow Aeronautical Co. (Model S-2A) Olney, Texas

PIPER PAWNEE

The ag plane with the "Safety Capsule" cockpit

PIPER AIRCRAFT CORP.

Lock Haven, Pa.

See advertisement on Page 48

Transland Aircraft (AG-2)
2600 West 247th St., Torrance, Calif.

AERIAL SPRAY EQUIPMENT

Agricultural Aviation Engineering Co. 858 Scott St., Santa Clara, Calif. (Span-Flow spreaders)

Spray Jet Mig. Co. 700 W. 12th St., Kansas City, Mo. (spray nozzles)

Bete Fog Nozzle Co. (spray nozzles) 309 Welles St., Greenfield, Mass.

Columbia Exporters (pumps) 730 S.E. 11th St., Portland, Ore.

Dakota Aviation Co. Huron, S. D. (Aero-Dyne spray tanks)

Harang Engineering 840 Lake St., San Bruno, Calif. (cleaner for spray equipment)

Hawthorne Aircraft Industries Valley View Ranch, Lucerne Valley, Calif. (Steurman parts)

Nissen Aviation Products 1840 Emory St., San Jose, Calif.

Harold L. Root (pumps)
406 E. Walnut St., Visalia, Calif.

Root-Lowell Corp. (spray nozzles) 445 N. Lake Shore Dr., Chicago

Simplex Manufacturing Co. 5224 NE 42nd Ave., Portland 18, Ore. (pumps, dump valves, spray booms)

Sorensen Aircraft (spray units) Worthington, Minn.

Spray Jet Mig. Co. 700 W. 12th St., Kansas City, Mo.

Spray Engineering Co. (spray nozzles) 100 Cambridge St., Burlington, Mass.

Spraying Systems Co. (spray nozzles) 3230 Randolph St., Bellwood, Ill.

Transland Aircraft

2600 West 247th St., Torrance, Calif. (Swathmaster combination spreader)

gicides, p. 80; Herbicides, p. 81. MISCELLANEOUS AIRCRAFT

CHEMICALS for Aerial Applica-

tion - Insecticides, p. 82; Fun-

EQUIPMENT & SUPPLIES

Aeroquip Corp. (hose assemblies) Jackson, Mich.

Agricultural Aviation Engineering Co. 858 Scott St., Santa Clara, Calif. (components, systems, designs)

H. D. Campbell Co. Farm Products Div., Rochelle, Ill. (fertilizer concentrate solutions)

Clark Aircraft, Inc.
P. O. Box 903, Marshall, Texas (metal wings & parts, Stearman)

Cooper Industries, Inc. 2149 W. Pratt Blvd., Elk Grove, Ill. (Super Flite aircraft finishes)

Copon Associates (airplane paint)
P. O. Box 1113, Houston 1, Texas

Dresser-Ideco Co. (hangars) 875 Michigan Ave., Columbus 8, Ohio

Elmer's Wing Shop P. O. Box 85, Waukena, Calif. (wooden Stearman wings)

H & M Agriflight High Lift Wing Mesa Del Ray Airport, King City, Calif. (metal-ribbed Stearman wings)

Motorola Communications & Electronics Inc. (two-way radios) 4501 W. Augusta Blvd., Chicago 51

Randolph Products Co. 12th St., Carlstadt, N. J. (Butyrate finishes)

Ruleto Industries Inc. 4823 Rosecrans Ave., Hawthorne, Calif. (metal Stearman wings)

Ruth Street Aircraft Woodwork Salinas Municipal Airport, Salinas, Calif. (wooden Stearman wings)

Sky Store (goggles & helmets) Hawthorne, Calif.

AFRIAL APPLICATING EQUIPMENT

Swathmasters for PA18 cubs to B-25's...you name it. 125 gal. Hopper for Cubs...185 and 230 gal. Hoppers for Stearmans. Pumps and spray equipment.

Write for free descriptive brochures.

TRANSLAND AIRCRAFT

Torrance Municipal Airport Torrance, California

Aircraft Finishes

Butyrate Finishes Chromated Enamel

RANDOLPH PRODUCTS CO.

Carlstadt, N. J.

CHIEF SPREADERS

For fast application

Model F-100 WS for uniform spread of lime and fertilizer

HENDERSON MFG. CO. Manchester, lowa

See advertisement on Page 58

FERTILIZER APPLICATING EQUIPMENT

Adams & Doyle Equip. Mig. Co. Quincy. Ill. (spreaders)

American Steel Dredge Co., Inc. Fort Wayne, Ind. (self-propelled liquid applicator)

Baughman Manufacturing Co. 236 Shipman Road, Jerseyville, Ill. (blender-spreaders)

Belt Corp. (spreader) Orient, Ohio

John Blue Co., Inc. (liquid applicators) Huntsville, Ala.

Broyhill Co. Dakota City, Nebr.

Calhoun Mfg. Co. (spreader) Cedar Falls, Iowa

Campbell Mig. Co. Walthill, Nebra.

Century Engineering Corp. 401 Third St., S.E., Cedar Rapids, Iowa (granule applicators)

Chowning Regulator Corp. Corning, N. Y. (pellet applicator)

Clark Manufacturing Co. Atherton, Mo. (liquid applicators)

John Deere (liquid & dry applicators) Moline, Ill.

Dempster Mill Mig. Co. Beatrice, Nebr. (liquid & dry applicators)

Fabricated Metals, Inc. 2400 Merced St., San Leandro, Calif. (bulk application equipment and liquid applicators)

Farmhand Co. (manure spreaders) Hopkins, Minn.

Farmwell Co. Ixonia, Wisc. (plastic spray tanks)

Finco, Inc. (liquid applicators)
Aurora, Ill.

Gandy Co. (spreader for granulars) Box 269, Owatonna, Minn.

General Metals (liquid applicators)
P. O. Box 448, Greensboro, N. C.
(liquid applicators, spreaders)

Hahn, Inc. (liquid applicator) 2000 N. Sixth Ave., Evansville 7, Ind. Henderson Mig. Co.
P. O. Box 60, Manchester, Iowa (spreaders)

Hercules Steel Products Corp. Galion, Ohio (spreaders)

Highway Equipment Co. 698D Ave. N.W., Cedar Rapids, Iowa (blender-spreaders)

International Harvester Co. 180 N. Michigan Ave., Chicago I (liquid applicators)

KBH Corp. (NH_e applicators) Box 246, Clarksdale, Miss.

Liberty Mig. Co. (hose pumps) Red Springs, N. C.

Pollard Mig. Co. (liquid equipment) Foshay Tower, Minneapolis, Minn.

Schelm Brothers, Inc. 201 Anna St., East Peoria, Ill. (liquid applicators)

Simonsen Manufacturing Co. Quimby, Iowa (spreaders)

Southern States Cooperative 7th and Main Sts., Richmond 13, Va. (blender-spreaders)

Standard Steel Mig. Co., Inc. 2137 N. Sherman Drive, Indianapolis, (spreaders)

Tryco Mfg. Co. (liquid applicators)
P. O. Box 1272, Decatur, Ill.

Tyler Mfg. Co.
East Highway 12, Benson, Minn.
(spreaders)

Welcome Mig. Co. (NH. applicators) Welcome, Minn.

INSECTICIDE APPLICATING EQUIPMENT

American Steel Dredge Co., Inc. Fort Wayne, Ind. (self-propelled sprayers)

Arrow Products Co. (fumigators) 447 Lincoln St., Carlstadt, N. J.

B & G Company (sprayers) Plumsteadville, Pa.

Banta Hi-Fog Co. (sprayers) 812 Truckway, Montebello, Calif.

John Bean Div., FMC 1305 S. Cedar St., Lansing 4, Mich. (mist blowers, sprayers, granule applicators)

R. & E. Bertani (mist sprayers) Abbiategrasso (Milan) Italy

Fertilizer Spreaders

Model N-48 2-4 Tons Model P 710 4-13 Tons

SIMONSEN MFG. CO. Quimby, lowa

See advertisement on Page 50

Baughman

LIQUID FERTILIZER SPREADER

Rapid Spread 40-60 ft. Spreading Design

BAUGHMAN MFG. CO. 325 Shipman Rd., Jerseyville, III.

See advertisement on Page 58

Besler Corp. (aerosol sprayers) 4053 Harlan St., Oakland Calif.

Broyhill Co. (sprayers) Dakota City, Nebr.

Buffalo Turbine Agricultural Equip. Co. 70 Industrial St., Gowanda, N. Y. (mist blowers, sprayers, dusters)

Campbell Bros. (mist blowers, sprayers) 30 Decretield St., Greenfield, Mass.

Campbell Mig. Co. (sprayers) Walthill, Nebr.

Carter Insecticide & Chemical Co. Box 209, Wallace, N. C. (fumigation kits)

Century Engineering Corp. 401 Third St., SE, Cedar Rapids, Iowa (granule applicators, sprayers)

Cooper, Pegler & Co. Ltd. P. O. Box 9-307, Burgess Hill, Sussex, England (mist blowers, dusters)

Cordox Corp. (mist blowers) Bell Building, Chicago 1

Curtis Automotive Devices, Inc. P.O. Box 297, Westfield, Ind. (fogging devices)

Decker Mig. Co. (sprayers) Janesville, Wisc.

John Deere (granular applicator) -Moline, Ill.

Devence Inc. (fog applicator) 150 Broadway, New York 38

Dobbins Div., Chamberlain Corp. Waterloo, Iowa (hand sprayers)

Dorman Sprayer Co., Ltd. Ditton Walk, Cambridge, England (knapsack sprayer & duster)

Ekholm Mfg. Co. (sprayers) 622 Watson Ave. St. Paul 2, Minn.

Fabricated Metals, Inc. 2400 Merced St., San Leandro, Calif. (fumigation equipment)

Farmwell Co.
Izonia, Wisconsin
(plastic spray tanks)

A. B. Farquhar Div., The Oliver Corp. 400 W. Madison St., Chicago 6 (mist blowers)

Finco, Inc. (high-clearance sprayers) Aurora 37, Ill.

Friend Manufacturing Co. 7 Prospect St., Gasport, N. Y. (mist blowers)

- Fumeral Co. (steam sprayers) Racine, Wisc.
- Gallo Co. (sprayers) 1312 Forest St., Racine, Wisc.
- Gandy Co.
 Box 269, Owatonna, Minn.
 (granular chemical applicators)
- Gard Industries, Inc. (sprayers) 1729 Harding Rd., Northfield, Ill.
- Gustafson Mig. Co. (soil fumigators) Corpus Christi, Tex.
- Hahn, Inc. (high-clearance sprayers) 200 N. Sixth Ave., Evansville 7, Ind.
- Hanson Equipment Co. (sprayers) 327 Charles St., Beloit, Wisc.
- Hardie Manufacturing Co. 1825 W. Franklin St., Evansville, Ind. (sprayers, mist blowers)
- Homelite Corp. (mist blowers) Port Chester, N. Y.
- Howard Rotovator Co. 1600 E. Davis St., Evanston, Ill. (soil mixer)
- Hub States Chemical & Equipment Co. (sprayers) 1255 N. Windsor St., Indianapolis, Ind.
- H. D. Hudson Manufacturing Co 589 E. Illinois St., Chicago 11 (sprayers)
- Insect Control Sales & Service P. O. Box 152, Candor, N. C. (soil fumigant applicators)
- KBH Corp. (hi-clearance sprayers) P.O. Box 246, Clarksdale, Miss.
- Marlow Pumps. Div.
 Bell & Gossett Co. (mist sprayer)
 Midland Park N. J.
- Mayrath Co. (sprcyers) Dodge City, Kans.
- F. E. Myers & Bro. Co. 249 Orange St., Ashland, Ohio (sprayers, mist blowers)
- Niagara Chemical Div., Food Machinery & Chemical Corp. 100 Niagara St., Middleport, N. Y. (liquid-dust applicators, mist blowers)
- Noble Manufacturing Co. Sac City, Iowa (granular DDT applicators)
- Oliver Corp. (aprayers) 400 W. Madison St., Chicago 6
- Potts Feed Mill & Gin Co. (mist blowers) Box 51, Crawford, Miss.
- Robinson Fan Corp. (mist blowers) Gilroy, Calif.
- Root-Lowell Corp. (sprayers)
 445 North Lake Shore Dr., Chicago 11
- Schelm Bros. Inc. (sprayers) 201 Anna St., E. Peoria, Ill.
- Scott Turbalog Co. (logging machine) Box 246, Auburn, Ind.
- Silver Creek Precision Corp (sprayers) Silver Creek, N. Y.
- Sol-Kraft, Inc. (mistblower) 10-42 47th Rd., Long Island City 1, N.Y.

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- Southern Mill Creek Products Co. P. O. Box 4297, Tampa, Fla. (sprayers)
- Standard Steel Mig. Co. (sprayers) 2137 N. Sherman Dr., Indianapolis 18, Ind.
- Todd Shipyards Corp (aprayers) 81-16 45th Ave., Elmhurst, N. Y
- Tryco Mig. Co. (sprayers)
 P. O. Box 1272, Decatur, Ill.
- Victor Products Corp. (sprayers) Ranson, W. Va.
- Walsh Mfg. Co. (boom sprayers) Charles City, Iowa

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- Acme Protection Equipment Co. 1201 Kalamazoo St., South Haven 8, Mich. (face masks)
- Allis-Chalmers (tractors) Milwcukee 1, Wisc.
- American Optical Co. (respirators)
 Mechanics St., Southbridge, Mass.
- Associated Precision Industries 6459 N. Sheridan Rd., Chicago 26 (spray nozzles)
- Bete Fog Nozzle Co. (nozzles) 309 Welles St., Greenfield, Mass.
- John Blue Co. (fertilizer pumps) Huntsville, Ala.
- Boettcher Supply Co. Beloit, Kansas (NH_a applicator knife)
- Broyhill Co. (lined tanks) Dakota City, Nebr.
- J. I. Case Co. (tractors) 700 State St., Racine, Wisc.
- Caterpillar Tractor Co. (tractors) Peoria, Ill.
- John Deere (tractors) Moline, Ill.
- Delavan Manufacturing Co.
 West Des Moines, Iowa
 (spray nozzles and accessories)
- Deming Co. (liquid fertilizer pumps) 510 Broadway, Salem, Ohio

Dorr-Oliver, Inc. (rubber-lined pumps) Stamford, Conn.

- Fairbanks-Morse & Co. (pumps) 600 S. Michigan Ave., Chicago 5
- Flexo Products, Inc. (dust masks) Westlake, Ohio
- Four Comer's Mig. 5055 Crater Lake Hwy., Mediord, Ore. (NH₆ applicator knife)
- General Metals Inc. 858 Goldsboro St., Greensboro, N. C. (pressure & non-pressure tanks)
- Gorman-Rupp Co. (pumps) 305 Bowman St., Monsfield, Ohio
- Harang Engineering Co. 840 Lake St., San Bruno, Calif. (cleaner for spray rigs)
- Hardie Manufacturing Co. (pumps) 1825 W. Franklin St., Evansville, Ind.
- Hill Engineering Co. 516 N. Sterling, Sugar Creek, Mo. (fiber glass tanks)
- H. D. Hudson Mfg. Co. (spray booms) 589 East Illinois St., Chicago 11
- Hydro-Dynamics Research Industries 115 N. Cicero Ave., Chicago 44 (pumps)
- Hypro Engineering Inc. (fertilizer pumps) 709 39th Ave., N.E., Minneapolis 21,
- International Harvester Co. (tractors) 180 N. Michigan Ave., Chicago 1
- O. E. Linck Co. Route 6, Valley Rd., Clifton, N. J.
- Marine Products Co. 515 Lycaste, Detroit 14 (pumps)
- Mine Safety Appliances Co. 201 N. Braddock Ave., Pittsburgh 8, (respirators, gas masks)
- Molded Fiber Glass Body Co. 3714 Ann Ave., Ashtabula, Ohio (fiberglass tanks)
- Raven Industries, Inc. Box 916, Sioux Falls, S.D. (fiberglass tanks)
- Root-Lowell Corp. (spray nozzles) 445 N. Lake Shore Dr., Chicago
- Schutte & Koerting Co. (nozzles)
 Cornwells Heights, Bucks County, Pa.
- Spray Engineering Co. (spray nozzles) 100 Cambridge St., Burlington, Mass.
- Spray Jet Mig. Co. 700 W. 12th St., Kansas City, Mo.
- Spraying Systems Co. (noszles) 3230 Randolph St., Bellwood, Ill.
- Stam's Mfg. Plant 114 N. 5th St., Watseka, Ill. (NH₆ applicator knife)
- Superior Steel & Malleable Castings Co. 700 Graham St., Benton Harbor, Mich. (NH₆ applicator knife)
- Tiura Mfg. & Scies P. O. Box 1087, Patterson, Calif. (applicator clamps & Shanks)
- Taylor Machine Works
 Louisville, Miss.
 (NH₂ applicator knife)

IMC Exhibit Higlights Trade Fair by H. H. Slawson

International Minerals & Chemical Corp. presented a graphic, thought-provoking exhibit at the International Trade Fair, held last month in Chicago under the auspices of the Chicago Association of Commerce and Industry.

"Food or Hunger?" was the theme of the IMC display, which was one of a large number of exhibits from 27 nations in Chicago's new McCormick Place exposition center.

The question, "Food or Hunger?" was raised on the first of a series of illuminated panels forming the background of the booth. In following sentences, it was pointed out that world population will double in 40 years. By 2,000 A.D., arable land the world over will increase from the present 3.4 billion acres to 3.7 billions. Thus, the problem, as stated in the IMC layout, is to feed twice as many people with only one-tenth more land.

"Fertilizer is the answer" it was asserted. "The world's available land must grow twice as much produce. It can only be done with four times as much fertilizer. With fertilizer, the world can double food production."

"It has been done in Greece," said the next panel. In 1939, 2½ acres there, fertilized with 22 pounds of fertilizer, produced 1,543 pounds of grain. In 1957, when 77 pounds of fertilizer was used, production on 2½ acres was doubled to 3,086 pounds.

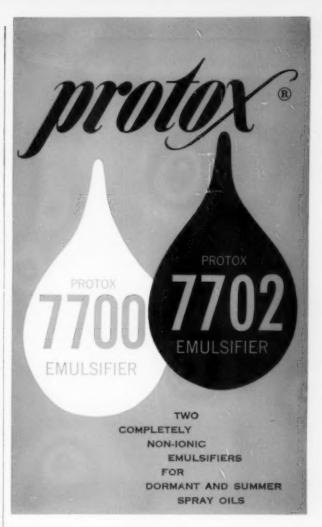
"It must be done in countries like India," according to the next panel. "In 1960, India, with one person for every acre of arable land, used one pound of fertilizer per acre. The average person's diet is 22.4 percent below the accepted nutritional minimum. Merely to hold that level against the population increase that is expected within 40 years, will require ten times the present use of fertilizer."

IMC kept its own part in the problem at a minimum, contenting itself with the statement "IMC is a world leader in production of the vital food producing minerals, potash, and phosphate."

There was an illuminated view of the new Carlsbad, N. M. mine, described as "one of the nation's top producers of potash." Another picture showed a bit of IMC's phosphate mining and processing operations near Lakeland, Fla., with the statement that "Phosphate products sufficient to fill it five times over, moved through this huge warehouse last year."

An added statement said IMC expects to begin production in 1962 from the world's largest known deposit of high-grade potash in Saskatchewan, Canada.

A special feature of the exhibit was a guessing contest in which the more than half a million visitors to the fair were invited to have a part. Push buttons lighted up the answer they gave to the question "How fast can you feed the world?" Winners, working within a prescribed time limit, received a prize.



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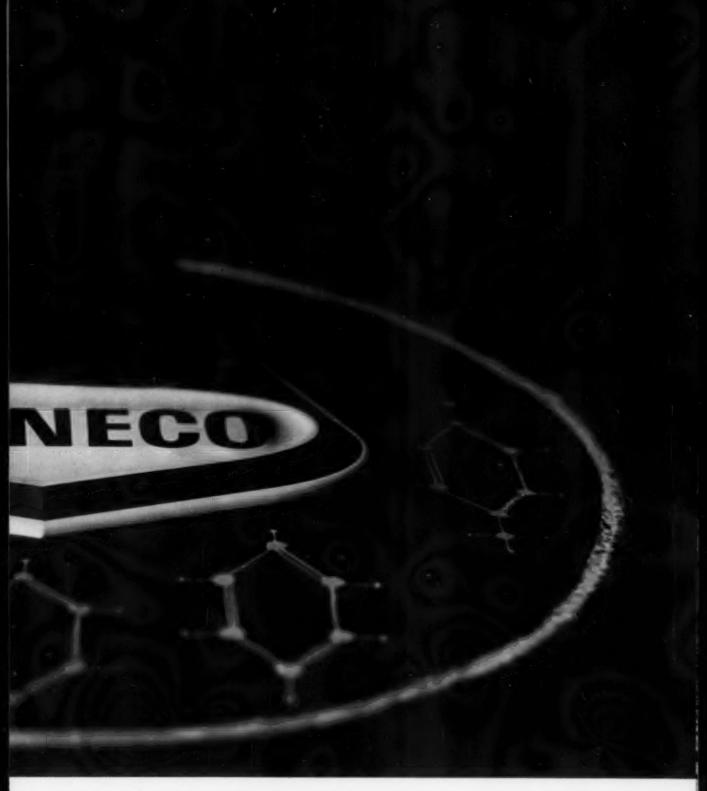
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AG Fertiliz

Fertilizer Views and News



by Vincent Sauchelli

Dr. Sauchelli is a Consultant to the Agricultural Chemicals Industry.

Creative Pricing VS Pricing By Accident

REATIVE pricing." Ever hear of it before? Mr. Fred C. Foy, president of the Koppers Company, Pittsburgh, Pa., coined the phrase during a talk before marketing specialists. He deplored the reckless price changes and resultant depressed revenues caused by pricing by accident. Asked to explain in more detail, he pointed out that in the chemical industry some branches had slashed prices that season without any relation to customer needs, or to market requirements, or to improvements in production. The cuts neither created new markets nor extended them. What they did create was a serious reduction in the operating margins of all those companies that met the price. He said he was sure that those companies that had met the price had not thought through what they were doing nor realized fully the consequences to their action.

Persons in the fertilizer industry responsible for making decisions may derive some comfort in knowing that other branches of the chemical industry are guilty of the same tendency toward reckless, illadvised pricing. But it is poor comfort at best. Growth and progress for any company are nurtured by the margin of profit in its total operations.

How is the chemical industry — fertilizer definitely included — to cure this sliding-profits situation caused by pricing without plan or, as some have called it, "price anarchy"? Mr. Foy analyzed the reasons for the situation: A company,

perhaps, has developed more capacity than its sales can sustain. In such a situation, management all too often meets it by slashing the price on the assumption that the cut in price will stimulate sales and keep the plant going at top capacity. Experience teaches us that this kind of reasoning is false. Price reductions, in most cases of that kind, do not create new business nor do they extend the market. Their net effect is to decrease materially the operating margins of all those in the field because, generally, competitors meet the price. Unless price cuts are related to customer or market needs, or to improvements in production, the cut in price is most unwise and will hurt. A product, said Mr. Foy, should be sold at a price that will enable a producer or an industry to earn that margin of profit essential to the continuation of research, development, and investment. Without that margin, growth and progress wither on the vine.

It takes no great intelligence to appreciate the dangers of pricing by accident: if too low one can price himself out of the market, out of growth, and out of business. Even the customer suffers, in the long run, from this uneconomic practice because, without research, he may not benefit through better products more suitable to his future needs. Furthermore, said Mr. Foy, management should consider the true value of a product to a buyer and the profit margin needed to maintain its growth through research, good wages,

financing of new production facilities, and maintaining a long range development and steady growth. Pricing based on hunches, emotion, and misinformation is the very opposite of creative, constructive pricing. Some of the other unfavorable factors that, in Mr. Foy's judgment, should be shunned by progressive management are: hidden concessions, such as special freight allowances, unreasonably long credit terms, quantity, and secret rebates.

In a recent questionnaire, conducted by one of the fertilizer trade journals, appears the following sad comment by an executive: "Neverbefore, since the 30's, have so many operators cut so many prices so severely, nor extended such crazy and unsound credit terms." He was not alone in making comments of this kind. Similar observations were made by fertilizer executives in most sections of the country. Credit extensions also were deplored as a continuing sore spot in the trade.

Commercial farmers in the United States cannot farm profitably without fertilizer. It is indispensable in today's farming. Our rapidly expanding population will be demanding more and better food products and services, while the acreage of suitable cropland remains almost static. Under such circumstances, the lang range view of the fertilizer industry is truly optimistic. Present consumption of fertilizer is not excessive. A certain minimum tonnage of fertilizers approximating current sales has to be utilized by American agriculture. Moreover, it is well known

(Continued on Page 148)

Ft. Meade, Florida . . . New Armour Phosphate Plant

\$60,000,000 AT WORK

Upon completion in 1962, Ft. Meade will become Armour's largest producer of phosphate products. This new plant is but one phase of Armour's 60-million-dollar Program of Progress aimed at keeping pace with the ever-increasing need for chemical fertilizers. Such huge, new construction projects reflect Armour's confidence in the growth of American agriculture and guarantee that the Armour "A" will continue to be the symbol of quality and reliability in the fertilizer industry . . . the "BIG A" in agriculture.

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AGRICULTURAL CHEMICALS

NEWS ABOUT THE TRADE

Carl E. Barnes Joins FMC

Dr. Carl E. Barnes has joined FMC Corp., San Jose, Calif., as vice-presi-

dent for research. His primary responsibility is in the direction of the research, development, and patent activities of FMC's chemical division, and his headquarters are at the administrative offices of



those divisions in New York. Dr. Barnes had been a research executive for Minnesota Mining and Manufacturing Co. for the past eight years.

ACS Discusses Residues

A series of workshops on methods for determining residues and food additives is a feature of the 140th American Chemical Society meeting being held September 3 to 8 in St. Louis, Mo. The workshops are a part of the Division of Agricultural and Food Chemistry. Other sessions are discussing the application of enzymes to food and agriculture, flavors, and chelation.

A complete report on the meeting will appear in the October issue of Agricultural Chemicals.

To Sell For Mid-South

William A. Giffen has been named sales representative in the north Mississippi and Alabama district for Mid-South Chemical Corp., Memphis.

Carbide Forms Department

Union Carbide Chemicals Co. has formed an integrated research and development department at its technical center in South Charleston, West Virginia.

Three directors have been named for the department. They are: Franklin Johnston, special projects; John W. Biddle, polymer chemistry; and Benjamin Phillips, organic chemistry. Dr. T. R. Miller is vice president for research and development for Union Carbide.

Merchandising Manager

W. W. Chadwick, New York regional sales manager for the Materials Department of International Minerals & Chemical Corp., Skokie, Ill., has been named manager of merchandising.

In his new post, Mr. Chadwick directs sales training, sales compensation and incentives, and related activities. He has been with IMC for 19 years.

AP&CC District Sales Mgr.

Harry L. Carroll has been appointed diswrict sales manager for American Potash & Chemical Corp., Los Angeles. His headquarters are in the company's Atlanta regional office.

Suter Named Geigy President

Charles A. Suter has been elected president of Geigy Chemical Corp., Ardsley, N.Y., succeeding William F.



Ardsley, N.Y., succeeding William F.
Zipse, president of
the firm since 1943.
Mr. Zipse, who has
been with Geigy
for 58 years, now
becomes chairman
of the executive
committee.
Mr. Suter had

years with J. R. Geigy, S. A. in Switzerland prior to joining the U.S. company. He was named vice president and director in 1943 and he has been executive vice president since 1950.

Bronson Heads TVA Branch

Dr. Roy D. Bronson has been appointed chief of the Soils and Fertilizer Research Branch in the Tennessee Valley Authority's Division of Agricultural Relations at Muscle Shoals, Alabama. He succeeds Dr. George Stanford, who resigned to join the Hawaiian Sugar Planters' Association.

Northeast Fertilizer Conference Lists Speakers And Topics

PLANS are nearing completion for the annual Northeast Fertilizer Conference to be held at the Schine Inn, Chicopee, Massachusetts, October 12 & 13, according to Dr. Merle V. Adams, Northeast Regional Director for the National Plant Food Institute, sponsors of the conference.

Among the speakers, and their topics, will be: Dr. Herbert Albrecht, director of the Pennsylvania Agricultural Extension Service, "The Future of Northeastern Agriculture and its Effect on the Fertilizer Industry"; Derl I. Derr, assistant secretary, American Bankers Association, "Financing Northeast-

ern Agriculture in the '60's"; and George Doherty, executive vice president, Topco Associates, "What Fertilizer the Grocery Shopper will Buy."

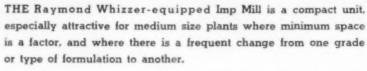
Also on the program are: Dr. Martin Weeks, professor of agronomy, University of Massachusetts, 'Fertilizer Placement'; Dr. Cecil Brown, professor of agronomy, University of Maine, "The Role of Fertilizer in Increasing Yields and Decreasing Unit Production Costs"; and Dr. Nyle Brady, head of the agronomy department, Cornell University, "Factors that Limit Response To Fertilizer."

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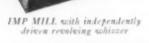


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To Expand Facilities

National Phosphate Corp., New York, has completed plans to substantially expand its facilities at Marseilles, Illinois. The expansion will include an approximate tripling of phosphoric acid capacity, the upgrading of a portion of the acid to diammonium phosphate, and integration of the company's raw material position by the construction of a sulfuric acid plant and a molten sulfur terminal.

National Phosphate Corporation, founded less than two years ago by Erol Beker, president and chief executive officer, brought its first unit into production last February. It is anticipated that its new expansion will be in operation by the second quarter of next year.

Robert M. Aude Dies

Robert M. Aude, president of the Heyden Chemical Division of Heyden Newport Chemical Corp. died last month at his home in Upper Saddle River, N. J. He was 47 years old. Before joining Heyden in 1953, he had been with Monsanto Chemical Co.

Allied Appoints Blalock

Jack M. Blalock has been appointed manager of heavy chemical sales for Allied Chemical's General Chemical Division. He has been with the division for 14 years and was manager of market surveys for the past two years.

Dedicate Research Unit

Stauffer Chemical Co., New York, has dedicated a new main laboratory and administration building at its Richmond, Calif., research center. Under construction for the past year, the building contains 53,000 square feet of floor space.

Central Appoints Ramsey

Loyal E. Ramsey has been appointed manager of the Butler, Pa., plant of Central Chemical Corp., Hagerstown, Md. He formerly was with the feed division of General Mills, Inc.

Foxboro Names Cushman

Howard R. Cushman has been named regional sales manager for the New York territory by the Foxboro Co., Foxboro, Mass. He succeeds John E. Hewson, who has been appointed field manager of the systems engineering division.

Swift In Joint Venture

Swift & Co. and Skelly Oil Co. plan to construct and operate a nitrogen products plant near Clinton, Iowa. The two companies have formed an Iowa corporation to construct the plant at a cost in excess of \$10,000,000. The new corporation is to be known as Hawkeye Chemical Co. and will be owned on a 50-50 basis by the two companies.

Capacity of the plant will be about 300 tons daily, with ammonia, nitric acid, nitrate solution, ammonium nitrate, urea, and nitrogen solutions as the principal products.

Joins Raymond Bag

Jerry H. Wright has joined the sales staff of Raymond Bag Corp., Middletown, Ohio. He had been with American Airlines.

Corrugated Price Raised

Continental Can Co.'s paperboard and kraft paper division has announced an 8 per cent price increase in corrugating material used to make shipping containers. The price applies east of the Rocky Mountains. The increase is \$9.50 a ton.

Soil Fertility Meeting

The annual meeting of the Alabama Soil Fertility Society will be held at the Whitley Hotel in Montgomery, Alabama, December 6 and 7.

Simplot Names Brissenden

C. E. Brissenden has been appointed assistant sales manager of the minerals & chemical division of the J. R. Simplot Co., Pocatello, Idaho. Mr. Brissenden has been with the company for nine years.

Round Table Lists Program For November 8-10 Meeting

The composition and use of new materials in fertilizer formulation will be among the topics to be discussed at the Fertilizer Industry Round Table, November 8 to 10, at the Mayflower Hotel in Washington, D. C.

T. P. Hignett, TVA, Wilson Dam, Ala., will lead the discussion on new materials and will cover 16-48-0, 18-46-0, and 21-53-0 as well as some older formulations, such as 11-48-0 and 13-39-0. Also to be discussed are the new high-nitrogen materials (30-10-0, 29-14-0, 20-10-10, and 20-20-0), bulk blending, and properties of DAP.

John O. Hardesty, Agricultural Research Service, USDA, Beltsville, Md., will lead a review of conditioning agents in mixed fertilizers.

A panel during the materials handling sessions will cover the fundamentals of weighing. Elmer Perrine, Allied Chemical Corp., will lead a discussion on handling liquids that has been divided into three sections. The first, anhydrous ammonia and solutions, will cover unloading and storage, and the remaining sections will cover phosphoric acid and sulfuric acid. Among those scheduled to appear on the panel are F. T. Nielsson, International Minerals & Chemical, and Thomas Martin, U. S. Industrial Chemicals Co.

A special feature of this year's Round Table will be a presentation by the National Safety Council on safety in the fertilizer plant.

All phases of packaging are to be covered by a panel that will consider such aspects as bag construction, palletizing, packers, and proper stowing of cars and trucks. Dust collecting will be reviewed by L. A. Eiben, Northern Blower Div., Buell Engineering Co. A survey of ammoniating practices will be discussed by Al Phillips of TVA.

Amchem Holds Weed and Brush Field Day

M ORE than 170 weed control specialists attended the 1961 Weed & Brush Field Day at Amchem Products Research Farm, Springhouse, Pennsylvania, July 25. Members of the research staff, including Director Robert H. Beatty, were on hand to explain the various projects under inspection. These included brush and soil sterilization experiments, turf tolerance plots, crab grass timing, corn and soybean weed and screening trials.

The tour was divided into four groups – turf research, brush and soil sterilization work, screening trials, and corn-soybean trials. The groups interchanged.

Weed control comments were led off by Anthony Tafuro, of Amchem, who covered the uses of Amitrol-T. Hirsch, Segal, research analytical chemist, discussed residues of Amitrol-T. Plant physiologist Dr. Stanley McLane continued the discussion, describing uses of Amiben on soybeans and other crops. Mel Sutherlan talked about the residue and tracer studies now being conducted on Amiben for soybeans at Amchem and at research stations on other crops. John Gallagher then discussed the use of Fenac in sugar cane, aquatic weed control, for witchweed, bromegrass, perennial weeds and roadside areas. William Gannon presented the toxicity status of Fenac and Amiben.

Other activities held during the afternoon were a tour of crab grass trials at Oak Terrace Country Club, and a demonstration of new industrial weed control techniques on the Amchem farm. Tours of the manufacturing and laboratory facilities were available to those interested.

One of the major interests of the day was the demonstration of invert emulsions applied by helicopter, using Amchem's centrifugal sprayer. Rod Gilson of the Keystone Helicopter Service performed the helicopter demonstration.

Named By Union Special

Henry Comploi has been appointed sales representative by Union Special Machine Co., Chicago, to cover the western half of the Province of Ontario, Canada. His headquarters are in Toronto. Mr. Comploi joined Union Special in 1959.

Control Officials To Meet

The 15th annual convention of the Association of American Fertilizer Control officials will be held at the Woodner Hotel in Washington, D. C., October 25 and 26. Dr. W. H. Garman, chief agriculturist of the National Plant Food Institute, will be one of the speakers at the convention and will discuss "Fertilizers and Our Changing Agriculture."

Also scheduled is a panel discussion of secondary, minor, and trace elements. Those on the panel will be: Dr. F. W. Quackenbush, moderator; Dr. Frank G. Viets, Jr., USDA; Dr. Robert E. Lucas, Mich-

igan State; Gordon Cunningham, Tennessee Corp.; and Dr. S. F. Thornton, Norfolk, Va. New legislation will be discussed by R. Z. Rollins, chief of the division of chemistry, Sacramento, Calif.

Bio-Search Moves Laboratory

Bio-Search and Development Co., has moved from Kansas City to a new location in Grandview, Missouri. The firm now is conducting its professional testing service out of a new laboratory and greenhouse at 12700 Prospect, Route 1, Grandview.

T-H Appoints Holthaus

Thompson-Hayward Chemical Co., Kansas City, Mo., has appointed Clarence D. Holthaus as general manager of its Rocky Mountain territory in Denver, Colorado. Mr. Holthaus formerly was branch manager of the company's laundry and dry cleaning supply division in Denver.

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Long distance unloading

"I gurn I've personally unloaded or supervised the unloading of better than 20,000 tank cars," said our materials handling supervisor, "but this was the first time I ever tried to unload one by long distance telephone.

"The plant manager who called was considerably embarrassed by the whole situation. He runs a small, efficient processing plant and is a good customer of ours for Tecmangam® (manganese sulfate), which he uses in his line of agricultural products. But the particular material he wanted to unload was not Tecmangam. In fact it did

not even originate at our plant. It came from another supplier whom he had been unable to reach by telephone.

"The situation was further complicated by the fact that not only was his unloading foreman off sick but this was the first time they had ever received this particular material. He said he did have a fresh-out-of-college chemical engineer handy, but this young man had assured him that tank car unloading had not been a prerequisite for his degree. I thought maybe I could work it out with him over the telephone anyway, so I asked if

I could talk to the new alumnus.

"Well, I outlined the entire procedure covering everything from foot valves to vent seals. Then he said, "Would you run that by again?"

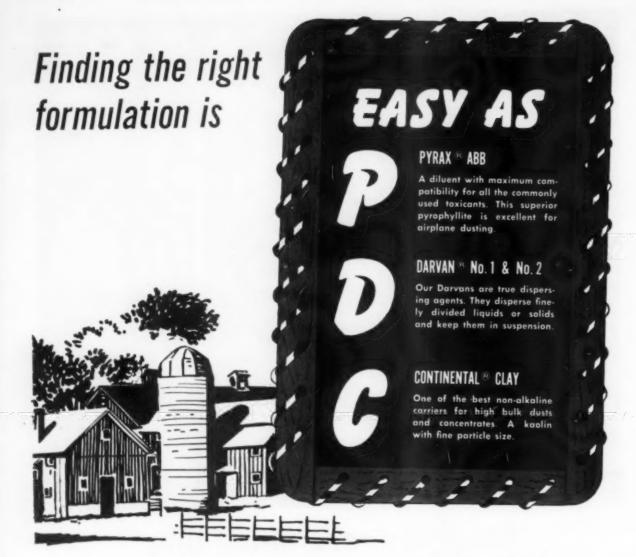
"So I did, several times. And about fifteen dollars later we had the tank car hooked up and unloading. And I now know a proud young chemical engineer who could probably unload a tank car blindfolded—because he had to learn it the hard way."

When it comes to service—we mean business, even if it's not always our own.

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, Subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee, Atlanta, Boston, Buffaio, Chicago, Cincinnati, Cleveland, Detroit, Greensboro, North Carolina; Hauston, Kansas City, Missouri, New York City, Philadeiphia, St. Louis.

Western Sales Representative: Wilson & Gea. Meyer & Campany, San Francisco, Los Angeles, Portland, Salt Lake City, Seattle.



Pest control becomes both economical and routine when you use Vander-bilt diluents and dispersing agents. Maximum compatibility eliminates formulation delays. Your toxicants will cling, cover and kill — and do their job with full effectiveness.

Precise quality control keeps all shipments uniform. Ample stocks and production facilities mean you can depend on prompt shipment, in any quantity, anytime.



R. T. VANDERBILT CO.,

SPECIALTIES DEPARTMENT

230 Park Avenue, New York 17, N. Y.

Please send TECHNICAL BULLETIN 23D on Diluents, Dispersing Agents and Stickers for Agricultural Dusts and Sprays

State	Application	
Name		

(Please attach coupen to your Company letterhead)

P-19

Swift Construction Starts

Construction has started on a new contact sulfuric acid plant at Swift & Company's phosphate centre at Agricola, Florida.

The new unit supplements two existing acid plants, tripling the president capacity. The Leonard Construction Company, Chicago, has the contract for engineering, procurement and construction of a Leonard-Monsanto unit. It is expected the new facility will be completed in April, 1962. Output of the new acid plant will be used in the production of the company's various plant foods.

"Construction of this new sulfuric acid plant is another step in Swift's long-range program for expanding its agricultural chemical business," C. T. Prindeville, vice president declared. "In the next two years, we will be associated in projects with a total investment of about \$30,000,000."

McCrory Named By Pennsalt

Dean E. McCrory has been appointed assistant district sales manager at Tacoma, Washington for Pennsalt Chemicals Corporation, replacing Ralph C. Schaeffer who was earlier named district sales manager at Salt Lake City.

Mr. McCrory joined Pennsalt in 1936 and subsequently served in chemical sales capacities in Pittsburgh, Philadelphia, Washington, D. C., Los Angeles and Portland, Oregon.

Joins Sulphur Institute

Jan Platou has joined the Sulphur Institute as information specialist in its European office. He is located in London.

D-O Shifts Monsor

Harold A. Monsor, for the past two years production manager, at Dorr-Oliver's Hazleton, Paplant, has been named director of production — Stamford. In his new post at the company's international headquarters in Stamford, Conn., he has administrative responsibility for production and purchasing operations at Stamford, and for the

company's manufacturing operations at Englewood, Colorado.

WACA Lists Program

The Western Agricultural Chemicals Association has published the program for its annual meeting to be held at the Hotel Claremont in Berkeley, Calif., October 9 to 11. Included among the speakers will be Dr. George L. Mehrens, director of the Giannini Foundation at the University of California, who will discuss "California's Agricultural Future;" Louis A. Rozzoni, president of the California Farm Bureau Federation, Berkeley; and Charles Paul, director of the California Department of Agriculture, Sacramento.

In addition, L. B. McNelly, farm advisor of Santa Clara County, will present a talk entitled "Can We Be Complacent?". Dan J. Keating, Stauffer Chemical Co., New York, also will be a speaker, as will Stuart W. Turner, a consulting agrologist from San Francisco.

FFVA Meeting Sept. 27

The Florida Fruit & Vegetable Association will hold its 18th annual convention September 27 to 29 at the Americana Hotel in Miami Beach, Fla.

Geigy Fills Hawaii Post

Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Ardsley, N. Y., has appointed V. W. Olney to be resident representative in Hawaii. Mr. Olney's headquarters are at Kailau, Oahu. He had been technical field man for Geigy in the northwest United States.

Heads Sales Planning

R. B. Korsmeier has been named manager of the Sales Planning, Development and Education section (SPADE) of the Dow Chemical Co.'s agricultural chemicals sales department. He had been district sales manager for agricultural chemicals in Dow's Los Angeles office.





TOMATOES



COTTON THE LOCATS DESCRIPT THE ACRE ON UNIV. 22.
CONTROL THE ACRE ON UNIV. 22.
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COTTON

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HERCULES UN-22.

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FORMS: AMMONIA, UREA, RITMATE UN-32
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OPEN DITCH OR SPRIVALED SYSTEM. SPRIV
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APPLICATION ESSELY UN INFORTATION WATER,
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SHOWN UN-32 CAM RELEP GIVE TOWN
COMPANIAMING TEC APPELL AND TRANSLATED.
INTO CASH, THAT'S NO SMALL POTATOES.



POTATOES

IN SPRING A YOUNG BEET'S FAMCY
TYWIST DO WA ZO RECORDES UPER ABMMONIUM BITRATE LIQUID FERTILIZER. BEETS
AND TEAM'S BESIST FAST WORKING, LONG
LASTIMG RITRATE COULD'S BE MORE COMPATIBLE UN 22 WORKS EASY. TOO. IN IRRIGATION
MARKE, OPER DITCH OR SPRINKLER SYSTEM. OR
IN SPRIA FAPILICATION OF ROOUND AND OR AIRPLANE. ASK YOUR FERTILIZER BEALER NOW
WHO STEED AND TO THE WEETEST BEETS
ADDING. THEY'LL REALLY GROW ON YOU.



SUGAR BEETS

HIGHER YIELDS WITH UN-32*

Our West Side Story: West Coast growers can't say enough about UN-32, the high-analysis urea ammonium nitrate fertilizer. Produced at Hercules, California, in convenient liquid form, UN-32 works wonders for any kind of crop. And West Coast fertilizer dealers are pretty keen about the unusual UN-32 advertising campaign which has provoked grower interest, and provided dealers with an extra tool for fertilizer sales.

Agricultural Chemicals Division HERCULES POWDER COMPANY Hercules Tower, Wilmington 99, Del.

DELNAV METADELPHENE NITROFORM THANITE TOXAPHENE

Allied Appoints Six

Allied Chemical's General Chemical Division has appointed six regional sales office managers and five assistant managers. The new sales managers and their territories are: Arthur H. Baker, New York metropolitan area; Albert B. Connelly, Houston; Harold E. Donaldson, St. Louis; William P. Doyle, Buffalo; Edmund R. Lett, Birmingham; and Wesley G. Webster, Denver.

The new assistant sales managers are: Lester I. Adams, New York; Joseph M. Byouk, Chicago; Stephen J. Muller, Los Angeles; Richard J. Regan. Philadelphia; and James E. Strader, Chicago.

Plan Taiwan Urea Plant

The Chinese Petroleum Corp. of Taiwan, the Socony Mobile Oil Co. and Allied Chemical Corp. have signed a preliminary agreement to increase their investment in the proposed urea plant in Miaoli, North Taiwan to \$22.5 million, of which the two American companies will put up 70 per cent.

In addition to building a new urea plant in Miaoli, with a capacity of 100,000 tons of urea a year as provided in the original agreement, a new contract reportedly calls for a complete set of ammonia-producing equipment to be provided to the Nankang plant of the Taiwan Fertilizer Corp.

Dow Fumigation Seminar

A fumigation seminar for field salesmen of the Dow Chemical Co.'s agricultural chemicals sales department was held in Houston, Texas, July 13 to 16. The training program was designed to better acquaint the sales representatives with present problems of their grain storage and milling customers, and to teach them latest techniques in practical fumigation.

Kennedy Elects Officers

At the first board meeting since the purchase of the controlling interest in Kennedy Van Saun Manufacturing and Engineering Corp. by McNally-Pittsburg, new officers were elected and installed. Edward T. McNally is the new chairman of the board. Maurice Shafer, formerly executive vice president of KVS, is the new president.

E. N. Kunkle, formerly vice president and with KVS since 1928, is executive vice president; and Hans W. Bodlaender, with KVS since 1948, now is vice president.

D-O Forms Subsidiary

Dorcon Incorporated, a wholly-owned subsidiary of Dorr-Oliver Inc., Stamford, Connecticut, is being formed to engage in the design, manufacture, fabrication and field erection of metal tanks, water and chemical storage facilities, and process and reaction vessels.

Officers of the new company will be president Alex Fino, treasurer K. Earl Abel, and secretary John W. Swick. Administrative and engineering offices will be at Warren, Pennsylvania, and sales head-quarters in Pittsburgh, Pennsylvania, with Max G. Walker as sales manager.

Spencer Acquires Packagers

Spencer Chemical Co., Kansas City, Mo., has acquired all of the outstanding stock of two suppliers of packaging materials. Crystal Tube Corp., Chicago, and Flexicraft Industries, Inc., New York, have become wholly-owned subsidiaries of Spencer. These companies design, print, and make bags from purchased polyethylene, cellophane, laminates, and other flexible materials for packaging uses.

U. S. Borax, Homestake Study

U. S. Borax & Chemical Corp., Los Angeles, and Homestake Mining Co. have jointly undertaken a study of large-scale potash production possibilities in Saskatchewan, Canada. The companies said that if the study proves the economic and technical feasibility of developing the Canadian reserves, they may form a jointly-owned company for such an operation.

GLENDON Insecticide Grade PYROPHYLLITE



The ideal diluent and carrier for insecticides

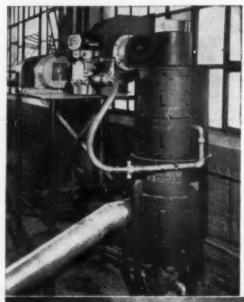
- ★Chemically inert—Insecticide Grade Pyrophyllite (aluminum silicate) has a pH range between 6 and 7. Because it is non-alkaline and chemically inert, it is thoroughly compatible with all leading pesticide chemicals. Will not react with them and lower their effectiveness.
- ★Non-Hygroscopic—Dusts compounded with Glendon's Insecticide Grade Pyrophyllite will not absorb moisture. Thus there is no tendency for the finished formulation to cake even following long storage.
- ★Uniform—Ground in a continuous mill and then treated in an air separator to remove oversize particles, 92 to 95% of the resulting product will pass a 325 mesh screen. Average particle size is below 5 microns. Weight, 32 lbs. per cu. ft. Because of its favorable physical characteristics and uniformity it forms homogeneous mixtures with pesticides and will not, like some other diluents, settle out from the active ingredients upon standing.
- ★Superior Adhering Properties—Because it is difficult to wet, Glendon's Insecticide Grade Pyrophyllite clings firmly to plant leaves even through heavy rains.
- ★Superior for Aerial Applications— When used as a carrier in dusts for aerial application, Glendon's Insecticide Grade Pyrophyllite has been demonstrated to settle more quickly than other diluents, thus minimizing the hazards of drift, waste of toxicant and failure to hit target areas.

GENERAL MINERALS CO.

P.O. Box 3504, Greensboro, North Carolina

MULTI-WASH **SCRUBBERS**

cover the fertilizer industry



There's a MULTI-WASH SCRUBBER to fit your code requirements-handle the air pollution clean-up job with surprising efficiency (up to 99.9%), and with economy too.

MULTI-WASH SCRUBBERS have no equal for simplicity. There are no moving parts, no spray nozzles to clog, and maintenance is held to a minimum. Even the effluent may be

Flexibility is another advantage. MULTI-WASH may be located outside the building, in the roof structure or on the roof itself, to conserve valuable floor space.

In some processes, money-making by-products can be reclaimed with MULTI-WASH.

Scrubbers can be supplied of steel alloys, coated or uncoated, or other special materials to meet all corrosive conditions. Special liquids may also be used for contact.

Handling of collected waste material presents no secondary pollution problem in its wet state.

Get our complete technical data applied to your conditions when you consider an air pollution control system.

APPLICATIONS

- Alumina and Magnesium dusts.
- Borax and Potash—Exhaust from kilns and dryers.
- Explosives Manufacture Fertilizers Nitrates and
- phosphates. ■ Fisheries - Odors from
- processing.
- Food—Dusts from process and
- packaging. Glycerine—Fatty acids and
- phthalic anhydrids.
- Graphite-Grinder dusts.
- Gypsum-Kettle exhaust.
- Kilns-Dusts.
- Organic and inorganic compounds.
- Paints-Pigment dusts and
- furnes. Paper-Sulphuric acid fumes.
- Petroleum-Cracking process odors and smoke.
- dioxide gases. Rayons—Hydrogen sulphides. · Rubber-Carbon blacks, accel-
- erators, fillers and mixers. · Starches-Exhaust from dryers and packaging.

· Pharmaceuticals-Exhaust from

mold dryers, etc. · Plastics-Dusts from handling

and packing. · Plating-Acid and pickling

· Sugar-Dryer exhaust and

· Quicklime-Cleaning carbon

- reclaiming.
- Tanneries—Buffing and dressing odors.
- Tungsten and Tantalum-Acid fumes, pickling and etching,
- Varnish—Cooking kettle fumes.

PRODUCTS:

Multi-Wash Collectors . Uni-Fla Standard Hoods . Uni-Fla Compensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrop Multi-Dyne Separators . Entrainment Separators . Settling and Dewatering Tanks . Skimmer Type Concentrating Tanks · Pressure Vessels and Storage Tanks

European Licensee: Elex S.A., Zurich, Switzerland

POLLUTION CONTROL

See Page in CEC

Canadian Licensee: Dace Industries, Windsor

CLAUDE B. SCHNEIBLE COMPANY . P.O. Box 296, Roosevelt Park Annex, Detroit 32, Michigan

Agronomy Meetings Nov. 27

The annual meeting of the American Society of Agronomy is scheduled for November 27-30 in St. Louis, Mo. Headquarters for the meeting will be the Sheraton-Jefferson Hotel, with some meetings also being held at the Statler-Hilton and in the Bishop Tuttle Memorial Building.

More than 400 reports on crops and soils research will be presented. Meeting with the ASA as usual will be the Crop Science and the Soil Science Societies of America. A feature of the 1961 meeting will be the 4th Conference on Agricultural Meteorology which is being sponsored jointly by ASA and the American Meteorological Society. One special program will cover the response of field crops to light, temperature, water, carbon dioxide, and competition from other plants.

Another feature of the meeting will be special soils papers to mark the 25th anniversary of the Soil Science Society of America. Each of the seven divisions of the SSSA has arranged for a wellknown soil scientist to keynote the progress and challenges in soil science. Other affiliated groups meeting with the ASA are the Council on Fertilizer Application, undergraduate students in agronomy, agronomic education specialists, extension agronomists, industrial agronomists and agronomists specializing in military land management.

Gen. Chem. Names Two

Charles B. Miller and Dr. Curtis B. Hayworth have been appointed assistant technical directors by the General Chemical Division of Allied Chemical Corp., New York. The two are headquartered at the General Chemical research laboratory in Morris Township, N. J.

O-I Shifts Cannon

Frank M. Cannon has been named assistant Eastern regional sales manager of Owens-Illinois' Paper Products Division. Mr. Cannon has been Eastern regional sales manager of the company's Multiwall Bag Division.

B. J. Ainsworth, sales representative in the Multiwall Bag Division in the New York area since 1956, succeeds Mr. Cannon.

Sulfur Found In Norway

Extensive deposits of cuprous sulfur ores – estimated at from 15,000 to 20,000 tons – have been found in the county of North Tronlelag, in Norway. Plans are being made to mine the deposits, but moving the ore will present a problem as a high mountain lies between the ore field and the nearest highway.

Grunewald Joins Hopkins

Richard O. Grunewald has joined Hopkins Agricultural Chemical Co., Madison, Wisc., as a sales representative. He had been with the Farm Equipment Division of Allis-Chalmers, Milwaukee.

SE Fertilizer Conference

The sixth Southeastern Fertilizer Conference will be held at the Atlanta Biltmore Hotel in Atlanta, Ga., October 5 and 6. The theme of the conference is to be "Expanding the Fertilizer Market."

Among the speakers will be Ralph Wehunt, TVA; Dr. U. S. Jones, Clemson; Dr. E. T. York, Federal Extension Service; and W. R. Allstetter, NPFI.

Heads New District

Henry F. Pierce has been appointed district manager of a new-ly-formed midwest agricultural chemicals sales district of Hercules Powder Co., Wilmington, Del. The new district, covering 14 midwestern states, has its headquarters in Louisiana, Missouri.

Mr. Pierce, who joined Hercules in 1951, had been assistant sales manager of the agricultural chemicals division, which now is a part of the company's synthetics department.

CUSTOM GRINDING

DDT

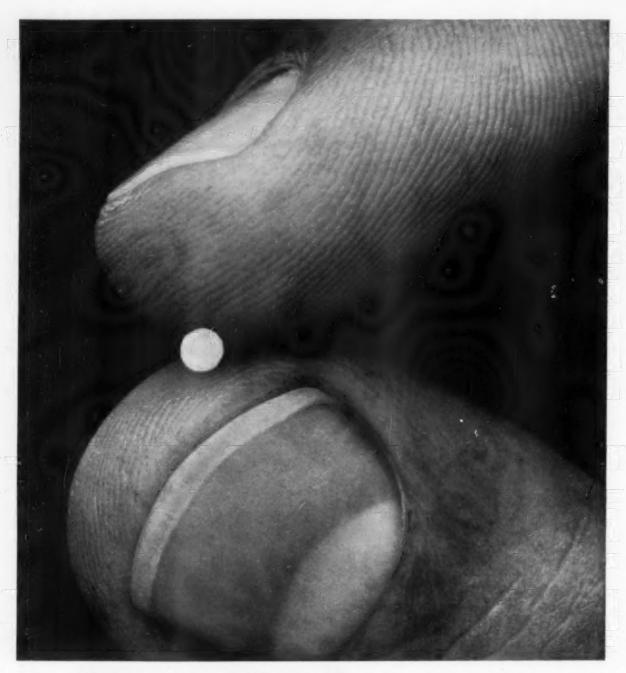
CUSTOM PACKING

Phone or Write Today!

LEBANON CHEMICAL CORP.

P. O. Box 532

Lebanon, Pennsylvania



From little urea prills big fertilizer profits grow

This remarkable urea prill, produced by Cobalez of Belgium, is probably the most economical and efficient source of solid nitrogen material available in the world today.

Belgian urea prills give you a guaranteed 46% nitrogen. The price per unit of nitrogen is comparable with competitive solid materials. What's more, the nitrogen is concentrated in a compact, uniform unit. Result? Excellent distribution. Easier handling. Substantial savings on transportation and storage.

Belgian urea prills are uncoated, yet so skillfully made they contain less moisture than coated material. They're free flowing; there's no dust problem. And you get maximum solubility (you can dissolve 880 pounds in 100 gallons of water at 68°F.).

Is it any wonder H. J. Baker goes 3,000 miles to get them?

You can buy Belgian urea prills in America right now. In quantity. With fast delivery assured. As the first step in seeing how much better they can do

the job for you-and how much bigger they can make your profits grow-send for a free sample and complete information. Simply write to the H. J. Baker office nearest you.

H. J. Baker & Bro., Inc.

733 Third Avenue, New York 17, N. Y.

Branch Offices: 208 South LaSalle Street, Chicago, Illinois • 501 Jackson Street, Tampa, Florida • 361 East Paces Ferry Road, N.E., Atlanta, Georgia.



Pesticide Airlift To Egypt



Shipment of Sevin insecticide is loaded aboard KLM plane for trip to Cairo.

The Egyptian government has purchased more than two million pounds of Sevin insecticide for use to protect the cotton crop grown in the Nile River Valley from an invasion of armyworms. The insecticide was flown to Egypt last month in a series of flights that involved more than 100 aircraft of all types, including military transport planes.

R. H. Wellman, manager Crag Agricultural Chemicals, Union Carbide Chemicals Co., New York, manufacturers of Sevin, said that the company's entire production of the insecticide was temporarily diverted for conversion to the sprayable powder needed by Egypt.

Reports from Egypt indicate that the cotton crop has been at least one-third destroyed by the armyworms. The loss has been estimated at \$25 million.

Flights of airplanes carrying the insecticide began on August 6 and continued until August 23. In Egypt, the pesticide is being applied by ground equipment and knapsack sprayers. Union Carbide agricultural specialists have travelled to Egypt from Europe and the Middle East to help supervise applications.

To Offer New Fertilizer

A high analysis fertilizer containing 30 per cent nitrogen and 10 per cent phosphorus will be manufactured by Spencer Chemical Co., Kansas City, Mo. A plant is to be constructed at the company's Jayhawk Works, near Pittsburg, Kansas, which will be capable of producing in excess of 50,000 tons a year of the new product.

Armour Personnel Shifts

Several personnel changes affecting operations of Armour Agricultural Chemical Co. in Nashville and Memphis, Tenn., and Albany, Ga., have been announced by Armour's fertilizer division.

Robert A. Dilliard, formerly plant manager at the Memphis fertilizer operation, has been named plant manager in Nashville. He succeeds George C. York, who retired after 35 years of service with Armour. Succeeding Mr. Dillard at Memphis is D. D. Spurlock, formerly assistant plant manager there.

AAAA Too Meet At Scotsdale

The Arizona Aerial Applicators Association will hold its 9th annual conference at the Safari Hotel in Scottsdale, Arizona, January 18 and 19, 1962.

To Expand Potash Project

Plans for a \$10 million expansion of production facilities at the potash mine project of its Canadian subsidiary have been announced by International Minerals & Chemical Corp., Skokie, Ill.

The expansion, which would boost output potential from 420,000 tons to 1,200,000 tons of potash product annually, is being planned to meet expected sales demand. The expenditures would bring total plant investment close to \$40 million upon completion.

Initial production from the shaft at Esterhazy, Saskatchewan, is expected by early summer of 1962 and refining facilities already completed will handle 420,000 tons of product annually. Engineering and design on the additional facilities will get under way immediately, the company said. Operation at the 1.2 million-ton rate will begin in January of 1963.



New!

C-H-E-L-A-T-E-D
NUTRAMIN

A multiple, water soluble blend for the prevention and correction of Trace Element deficiencies in plants, Nutramin contains:

MANGANESE
IRON ZINC
COPPER BORON
MOLYBDENUM

in adequate, carefully controlled amounts.

Especially formulated for fertilizer solutions, trace element Nutramin will not precipitate since all its metal components are completely CHELATED. Nutramin disperses quickly and evenly in solution and is compatable with complete liquid fertilizers. It is stable under both acid and alkaline conditions and, due to chelating, offers maximum availability to plants when applied to the soil or used in foliar feeding.

Available in 100 lb. drums; shipped from our plant at Metuchen, N. J.

Write for sample, analysis and complete details on CHELATED Nutramin

Davies Nitrate Co.

INCORPORATED

IIB LIBERTY STREET NEW YORK 6, N. Y.

BALANCE MAKES THE

DIFFERENCE...

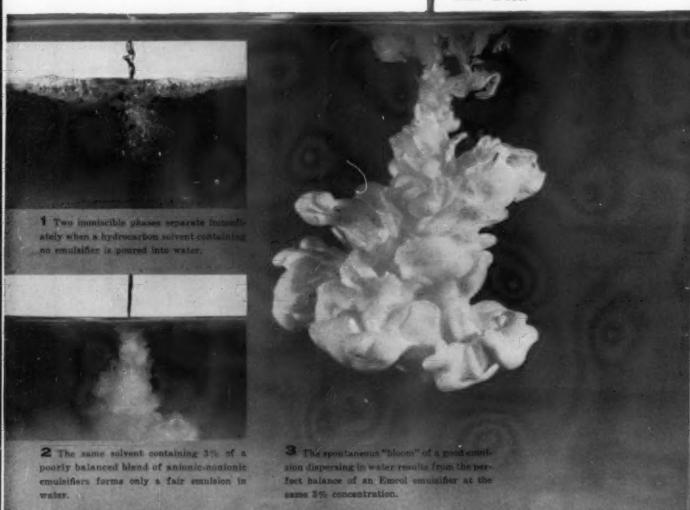
... in solving problems that involve surface active agents. The perfect balance of many components is often required to create an emulsifier to assure optimum performance. Proper balance also means savings through more economical emulsifier levels.

Witco's Emcol surface active agents offer the chemist the broadest latitude in solving problems involving emulsification, dispersion, and other colloidal effects. The Emcol line includes anionic, nonionic, and cationic products. For more information on these versatile materials, send for your copy of Witco's brochure describing the "Emcol Surface Active Agents". Write to Technical Service Department E-510.

WITCO CHEMICAL COMPANY, INC.

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omces in: Chicago • Suston • Akron • Atlanta • Hous ancisco • Toronto and Montreal, Canada • London an w, Scotland • Rotterdam, The Netherlands • Faris, Fi



EMCOL DIVISION

Warns On Pesticide

A Parliamentary Investigation Committee last month accused the British Ministry of Agriculture of negligence in not obtaining sufficient information about the "lethal side-effects" of agricultural chemicals on various forms of wildlife.

In a 312-page report now on sale in London, the committee has called for the "immediate prohibition" of aldrin, dieldrin, and heptachlor. The committee also recommended that safety regulations governing the use of all agricultural chemicals should be re-examined and, where necessary, tightened.

Wildlife societies and conservation groups in England have, for some time, been criticizing the use of chemicals that are used to treat seed. One witness from the Government's Nature Conservancy said recently, at a meeting of a Select Estimates Committee, that the "threat from toxic chemicals, is quite probably the biggest risk

to wild life and game that has occurred in this country."

The Committee "recommended that the Minister and the Secretary of State (for Agriculture) should initiate a comprehensive inquiry into the effect upon agriculture, public health, and upon the ecology of the country of all chemicals used in agriculture."

Wilson Heads V-C Board

David K. Wilson has been elected chairman of the board of Virginia-Carolina Chemical Corp., Richmond, Va. He succeeds Justin Potter, who will continue as president and chief executive officer. Mr. Wilson has served as a V-C director since January, 1958.

Named Plant Manager

Allan Hoffman has been appointed to manage the anhydrous ammonia plant being built at Hastings, Neb., by the Consumers Co-operative association.

Escambia Sales Meeting



A group of Escambia sales personnel are shown inspecting a low-pressure tank car used for shipping Bay-Sol ammoniating solutions. Inspection of Escambia's Pensacola, Fla., plant and its facilities was part of a four-day sales program conducted for the company's recently-expanded sales force.

Escambia announced on July 1 that it would handle the sale of all nitrogen products by its own sales force. The meeting was held to acquaint the new sales staff with company facilities, products, and plans.

Moss A. Kent Dies

Moss A. Kent, retired v.p. of Phelps Dodge Co., died last month.



THE SUPERIOR
ANTI-CAKING,
CONDITIONING AND
COATING AGENT
FOR HIGH-ANALYSIS,
GRANULAR,
COMPLEX
FERTILIZERS

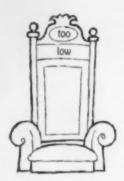
KENITE 51 made from high-quality diatomite (diatomaceous silica) is highly economical to use. It is up to 400 percent more efficient than other conditioners because of its greater surface area. This means less is needed, leading to a very low cost per ton of fertilizer conditioned.

Write today for complete information on KENITE 51 and learn how it will improve the handling of your fertilizer and result in more satisfied customers.

· Kenitize Your Fertilizer!

KENITE CORPORATION

OVERHILL BUILDING SCARSDALE, N. Y.





nce there was a formulator.

He formulated granular pesticides.

First he tried low-absorbent granulars.

But their absorbency was too low.

Next he tried high-absorbent granulars.

But their cost was too high.

Then he tried Magcobar's new GRANULEX.

AND IT WAS J-U-S-T R-I-G-H-T!



New GRANULEX is just right for you. In fact, it's just right for the majority of today's formulations. It's more absorbent than other low cost granulars.

It's available in popular meshes, too.

Write for sample and try GRANULEX.
You'll formulate happily ever after.

MAGNET COVE BARIUM CORPORATION

Philadelphia 7, Pa. 702 Western Savings Fund Bldg. Houston, Texas P. O. Box 6504



ESA To Hear 200 Papers

More than one thousand member entomologists are expected to attend the annual meeting of the Entomological Society of America, to be headquartered at the Mc-Allister and Solumbus Hotels, Miami, Fla., November 27-30.

More than 220 papers resulting from research on as many matters of insect interest will be presented, said Dr. D. O. Wolfenbarger, program chairman for the meeting. Dr. Wolfenbarger, who is entomologist at the Subtropical Experiment Station, Homestead, Florida, also lists six symposia and six panels planned on subjects as widely varied as "Genetics in Entomology" and "The Use of Chemosterilants for Insect Control."

Dr. J. E. de Wilde, director of the Agricultural University of Wageningen, The Netherlands, is one of nine invited speakers and will discuss "The Relationship Between Hormones and Insect Ecology."

Nine separate sections will meet in separate and general sessions during the four days. Control of insect pests by safe use of chemicals, by biological control, and by relatively novel methods will be a major subject of consideration by research, extension, industrial and practicing entomologists.

ESA will sponsor an Insect Photo Salon to be held in conjunction with its meeting.

The salon will be conducted according to practices approved by the Photographic Society of America. Entry blanks can be obtained from Lewis S. Maxwell, 506 E. Hollywood Ave., Tampa 4, Fla. Closing date for entries is Nov. 11.

Superphosphate Meeting

A record number of about 170 delegates from 22 countries is expected by the International Superphosphate Manufacturers' Association to attend its biennial technical conference in Wiesbaden, Germany, September 11 to 15. Twentyone papers are being presented, dealing with both straight and compound fertilizers, the produc-

tion and uses of sulfuric, phosphoric, and hydrochloric acids for the fertilizer industry, the recovery of by-products, and other aspects.

Supervises Tech. Sales

J. R. McCambridge has been appointed supervisor of technical sales activities for Chemagro Corp., Kansas City, Mo. He had been technical sales representative in the company's western region.

Florida Pollution Suit

The Florida State Board of Health. Jacksonville, has filed suit in Polk County circuit court at Bartow against Virginia-Carolina Chemical Corp. The board is seeking an injunction to prevent V-C from dumping wastes into the Alafia River and to force the company to change its present method of waste disposal, which is alleged to have killed fish. Justin Potter, V-C president, says his firm has taken "necessary corrective actions."

PPG Starts Construction

The chemical division of Pittsburgh Plate Glass Co., Pittsburgh, Pa., has started construction of a 15,000-ton per year sodium chlorate plant at its Lake Charles, La., facility. Production is scheduled to begin in September 1962.

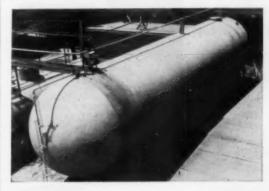
Raymond Assigns Heydt

Raymond Bag Corp., Middleton, Ohio, has assigned E. E. Heydt to represent the company in the Michigan, northern Indiana, and Ohio sales area. He previously was connected with Raymond's Chicago office.

Nitrogen Project For Eire

A nitrogenous fertilizer industry is to be established in Ireland at Arklow, 60 miles south of Dublin, by a new State-sponsored company.

The consumption of nitrogenous fertilizers in Eire at present is almost 100,000 tons per year.



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Insects Seen As Weapons

CROP-killing insects, microbes, and chemicals are regarded by U. S. military scientists as feasible weapons of war that could be used to devastate an enemy's agricultural economy as efficiently as conventional armaments, at less cost and, perhaps, less risk, according to a report in the Wall Street Journal last month. The report was prepared by Joe Weston, a Journal staff reporter.

Anti-crop warfare, it is felt, could be launched secretly, possibly be saboteurs. The nation under attack would have to decide whether to blame natural causes or enemy action, whether to retaliate and against whom, and whether to use biological, thermonuclear, or other weapons.

Red scientists are highly knowledgeable in the techniques of biological assults. While there is no proof of the possibility, they may be employing these weapons at this very moment in Latin America, Africa, Turkey, and Pakistan, on the principle that economic distress provides political opportunities, according to the Journal story.

This statement is based on mysterious new outbreaks of plant and animal diseases around the globe in recent months, along with persistent attacks by longer-established pests. Parasitic cattle ticks and disease-ridden flies, for instance, are causing unusually high losses of hides, beef, and milk in Central and South America. Swarms of locusts, caterpillars, and crickets are infesting crops in pro-Western Pakistan.

A U. S. Department of Agriculture spokesman is quoted as saying that the U. S. is "compelled to assume that potential enemies may attempt to introduce and disseminate serious foreign pests and diseases in America and that they may be successful in doing so." In self-defense, the U. S. is developing a retaliatory capability. Much of this work is being done at the Biological Warfare Research Center, Ft. Detrick, Md.

Galloway Joins Grace

Lawrence W. Galloway, formerly assistant general sales manager of the Baugh Chemical Co., has joined W. R. Grace & Co. Davison Chemical Division, Baltimore, as sales manager for fertilizer materials in the mixed fertilizer division.

IMC Reports Best Year

International Minerals & Chemical Corp., Skokie, Ill., reports that net earnings for the fiscal year ended June 30 were up seven per cent on a five per cent gain in sales. This marks the highest annual earnings and sales in the company's history.

To Increase Facilities

Two new facilities for the manufacture of ammonium nitrate solution and ammoniated nitrate (ANA) will be built by Hercules Powder Co. at its plant at Louisiana, Missouri. Completion of the new units is scheduled for next summer.

LITERATURE AVAILABLE

Bulletins listed in this column are available from the organizations by which they are prepared.

Mississippi Recommendation . . Mississippi Crop and Fertilizer Recommendation, by Agricultural Experiment Station of Mississippi State University, Bulletin 610, January 1961, 24 pages. Giver recommendations and tables for major field crops. Mississippi State University, State College, Mississippi.

AC

Maine Research . . . Maine Farm Research, Volume 8, Number 4, January 1961, 28 pages. A quarterly report of agricultural progress through research. Maine Agricultural Experiment Station, Orono, Maine.

AC

Cotton Tests . . . Mississippi Cotton Variety Tests For 1960, Agricultural Experiment Station of Mississippi State University, Bulletin 611, January 1961, 16 pages. Tables list the results of tests at various stations. Mississippi State University, State College, Mississippi.

Soybean Oil . . . Soybean for Oil in Alabama, Agricultural Experiment Station of Auburn University. R. D. Rouse, Circular 138, March 1961, 15 pages. Explains how soybeans should be planted and fertilized. Auburn University, Anburn, Alabama.

AC

Grain Sorghum Hybrids . . . Performance of a Grain Sorghum Hybrids in South Carolina 1960, Clemson College Extension Service. Circular 470, Revised April 1961, 155 pages. Tells of choice, performance and test of hybrids. Clemson College Extension Service, Clemson, South Carolina.

AC

Crabgrass . . . Prevention and Control of Crabgrass in Lawns, Connecticut Agricultural Experiment Station. J. F. Ahrens & A. R. Olsen, Bulletin 642, March 1961, 8 pages. The Connecticut

Agricultural Experiment Station, New Haven.

Shade Trees . . . Diseases of Shade Trees and Shrubs, Bartlett Tree Experts. Dr. P. L. Rusden, Educational Bulletin Number 107, 1961, 5 pages. Charts of diseases. Bartlett Tree Experts, 2770 Summer Street, Stamford, Connecticut.

South Carolina
1961 Fertilizer Recommendations for
South Carolina, Clemson College Extension Service. Circular 476, January
1961, 13 pages. General Fertilizer recommendations for field crops are enclosed in chart form. Clemson College
extension Service, Clemson, South
Carolina.

Tree Topics . . . Scientific Tree Topics, Bartlett Tree Research Laboratories. Volume 2, number 8, 1961, 22 pages. Pictures and definitions of tree disease causes are explained. Bartlett Tree Research Laboratories, 2770 Summer Street, Stamford, Connecticut.

AC

Grass . . . Pastures In Georgia, University of Georgia College of Agriculture. Bulletin 573, Revised, October, 1960, 55 pages. Describes the various types of grazing legumes in the pastures in Georgia. Cooperative Extension Service, University of Georgia College of Agriculture, Athens.

Fertilizer Ideas . . . Purchasing For Profit, International Minerals & Chemicals. Copyright 1960, 45 pages. Explains purchasing practices and functions. International Minerals & Chemical Corporation, Old Orchard Road, Skokie, Illinois.

Weed Control . The Use of Pre-Emerge Herbicides For Weed Control in Young Coffee, IBEC Research Institute. Number 25, 1961, 39 pages. Discusses the methods, materials and results of controlling weed problems of coffee trees. IBEC Research Institute (Division of American International Association) 30 Rockefeller Plaza, New York 20, New York. A SKILLED HAND IN CHEMISTRY . . . AT WORK FOR YOU

EMULSIFY ALL TOXICANTS with just 2 sets of balanced complementals



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Many people in management believe that nitrogen loss in ammoniation, over-analysis, bag breakage, loading and unloading, amounts to only 4 or 5%.

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More typically, they may approach 15%.

These are findings by Texaco technical experts who help tighten procedures in fertilizer plants as part of the over-all Texaco "Stop Loss" program. For instance, nitrogen losses — including losses of ammonia, N2 and oxides of nitrogen — are found to be a prime problem in making mixed fertilizer. Our people can advise on proper methods of mixing to avoid losses during ammoniation ... on plant processes such as crushing, screening, drying, cooling. You can also tap our experts' knowledge of transportation and unloading equipment, storage and handling.

Would you like to have a Texaco man visit you for a look at your possible losses? The service is free. Write to Texaco Inc., *Petrochemical Sales Division*, 135 East 42nd Street, New York 17, N. Y., or 332 South Michigan Avenue, Chicago, Illinois. Dept. ACH-40

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Hooker to Exercise Option

Hooker Chemical Corp., New York, will exercise its option to purchase enough stock of a new Argentine phenol and monochlorobenzene producer, Duranor, Industrias Quimicas Sociedad Anonima Industrial y Comercial, to bring its interests to 50 per cent.

An equivalent investment in the jointly-owned company will be held by a major Argentine manufacturer of chemicals and plastics, Atanor, Compania Nacional para la Industria Quimica, S. A. M., of Buenos Aires. Shipment of U. S. manufactured equipment is expected to begin late September and ground will be broken in about three months.

The new Duranor chemical plant is Hooker's first step in a planned expansion of company activities in Argentina.

Vulcan Names Newman

Robert B. Newman has been named vice president - director of sales for Vulcan Containers, Inc., Bellwood, Ill. He joined Vulcan-Associated Container Companies Inc. at Birmingham, Ala., in 1959 and served as assistant to the president.

George G. Miller Dies

George Graham Miller, assistant general sales manager for northern and midwestern territories, F. S. Royster Guano Co., Norfolk, Va., died unexpectedly of a heart attack July 19. He was 48 years old.

V-C Earnings Up, Sales Down

Virginia - Carolina Chemical Corp., Richmond, Va., realized slightly higher net earnings on lower sales in the fiscal year which ended June 30. Year-end earnings after taxes, but before special charges, amounted to \$2,525,627, compared with \$2,105,719 last year.

Sales were \$83,816,553, compared with \$86,822,359 in the 1959-60 fiscal year.

Edward R. Adams, V-C's vice president for finance, said that the decline in sales was the net effect

of volume losses in the company's fertilizer and bag division, partially offset by gains in mining and chemicals.

Corn Production Down

Corn production this year will be below consumption for the first time in 10 years, according to John A. Baker, director of agricultural credit services for the U.S. Department of Agriculture. He said that the Emergency Feed Grain Program will cut the 1961 corn harvest by 700 million bushels-18 per cent below the 1,891,000 total for

Addressing a fertilizer management seminar at International Minerals & Chemical Corp. headquarters in Skokie, Ill., Mr. Baker said that the reduction will save the federal government more than a half million dollars in reduced storage and carrying charges, after cash payments paid or promised to farmers who diverted feed grain acres under the program.

Heads Potash Div. Sales

Bryan W. Guess has been named head of sales for the new potash division of Texas Gulf Sulphur Co., New York. Mr. Guess had been assistant manager in the company's sulphur sales depart-

The new potash division will mine a large potash deposit in southeastern Utah. With mine construction already underway, production is expected to begin late next year and shipments should commence shortly thereafter.

Hercules Appoints Givens

Kenneth T. Givens has been appointed assistant sales manager of pesticides for Hercules Powder Co.'s agricultural chemicals division. Mr. Givens, formerly the senior technical sales-service representative for the division Brownsville, Texas, has moved to the home office of Hercules in Wilmington, Del. He joined the company in 1952.

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To Meet In Baltimore

The Eastern Branch of the Entomological Society of America will hold its 33rd annual meeting at the Lord Baltimore Hotel in Baltimore October 30 and 31.

Among the features of a tentative program for the meeting is a panel discussion of "Entomology in the World Today." Scheduled to appear on the panel are Edson Hambleton, Agricultural Research Service. USDA; William N. Sullivan, Jr., Entomology Research Division, USDA; and Roy Fritz, ICA, Office of Public Health, Washington, D. C.

Control of Spider Mites

Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Ardsley, N. Y., has announced that Chlorobenzilate miticide has been approved for control of spider mites on cotton.

Spider mites controlled by Chlorobenzilate include Atlantic, European, red, Pacific, Schoene, and two-spotted spider mites. The product is available as Chlorobenzilate 25E (25% emulsifiable solution) and Chlorobenzilate 25W (25% wettable powder.)

Heads Best's Advertising

Judd H. Rose has been named advertising manager for the Best Fertilizers Co., Lathrop, Calif. He had been with Givens-Davies Advertising Agency of Boise, Idaho.

46th A. I. Ch. E. Meeting

The 46th national meeting of the American Institute of Chemical Engineers will be held in the Lake Placid Club, Lake Placid, N. Y., September 24 to 27. Management is the theme of meeting.

Rheay Joins Vulcan Steel

John C. Rheay has joined Vulcan Steel Container Co., Birmingham, Alabama, as part of its sales staff in the southeast. He is serving as a sales-service representative for the Florida territory.

Washington Weed Meeting

The Washington State Weed Conference will be held at the Chinook Hotel in Yakima, Washington, November 6 and 7. Among the speakers will be: Keith Wallace, Spokane County Agent, "Control of Perennial Weeds;" Rex Warren, Oregon State University, "Factors in Soil Sterilization;" and Richard Fosse, Amchem Products, Niles, Calif., "Right-of-Way Weed Control."

Also scheduled to appear on the program are: Vic Bruns, US-DA, "Weed Control in Non-crop Land;" Robert Allen, Tri-Cities National Bank, "Economics of Farm Weed Control From a Banker's Viewpoint;" Chester Canode, USDA, "Weed Control in Grass Seed Crops;" and Arthur Myers, Western Washington Experiment Station, Puyallup, "Weed Control in Ornamental Shrubbery."

Egyptian Plant Expanded

The second stage of production facilities of the nitrogen fertilizer plant at Aswan, Egypt, has been put into operation. The daily production of ammonium nitratelimestone now is increased from 1,200 tons to 1,600 tons. Further expansion in production capacity depends upon availability of power from the Aswan dam, which has been under construction since January 1960.

Study Grants To Pakistan

Two grants for five-year studies of natural enemies of orchard and forest insect pests have been made to the Commonwealth Institute of Biological Control at Rawalpindi, Pakistan. The grants were awarded under a program financed by foreign currencies obtained from the sale of U. S. agricultural commodities abroad.

J. R. G. Sutherland Dies

J. R. Gordon Sutherland, assistant manager of Cyanamid International's agricultural department, died last month. He was 50 years old.

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When herbicides are used, Oldbury® sodium chlorate is still the most effective weed killer you can get for such troublemakers as Johnson grass, bindweed, Canada thistle, and Russian knapweed.

Oldbury sodium chlorate sterilizes the soil . . reaches right down to the roots of the weed . . . and keeps working for months.

Oldbury sodium chlorate is inexpensive. For a mere 25¢, you can sterilize 100 square feet of drainage ditch, fence line or roadway for a year or longer.

Open-head drum empties easily. Oldbury sodium chlorate comes in a fast-opening drum. A single lever seals and reseals the drum with a metal band. Full open head makes pouring, scooping, or shoveling easy.

Available in 50-, 100-, and 450-lb. sizes.

Technical aid. Full-time Hooker agronomists can help with weed control plans and advise on handling, storing, and using sodium chlorate. Write for descriptive folder.

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Znzinc	.04	.04
Mn MANGANESE	.049	.097
Fe IRON	.12	.039
Mo MOLYBDENUM	.0013	.0013

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Being fritted and slowly soluble at a controlled, predetermined rate, FTE won't leach out-or become fixed in the soil. It stays in the root zone and releases the nutrients as needed, all through the growing season.

Two standard formulas are immediately available.

Others are being developed for specific areas of the country. All can be safely used anywhere, and on any crops, simplifying both manufacturing and marketing of fertilizers.

If you're not now using FTE, you'll find it profitable to do so. It costs but little, and can make a big difference-in the results your customers get; in your own future sales and profits.



CORPORATION Agricultural Division

BOOK REVIEWS

Guide to U. S. Government Statistics, by John L. Andriot. Published by Documents Index, Box 453, Arlington 10, Va. 402 pages, price \$15 (10% discount for cash orders).

This is the latest in a series of bibliographical guides covering various phases of the U. S. Government publication program. It makes available to those interested in obtaining any type of data a compact, comprehensive reference tool. This volume covers over 2,000 items, including the recurring publications, the statistical series, and the many one-time publications of statistical value.

The book consists of two parts. One, the Guide, arranged by departments and agencies of the government, lists the various publications containing statistical data with appropriate bibliographical information and annotations of the statistical contents; and, two, the Index, is a detailed subject index with each entry coded to show frequency and type of data.

Of special interest to those in the agricultural chemicals field will be the 95 pages that are devoted to Department of Agriculture publications. In addition to the more than 400 numbered publications, a complete listing of market news reports by city, state, and office also is included.

The Chemistry and Mode of Action of Herbicides, by A. S. Crafts. Published by Interscience Publishers, New York. 269 pages, price \$9.

This book is an expansion of Dr. Crafts' contribution to the first volume of Advances in Pest Control Research. A comparison of the book with the author's earlier article illustrates the rapid development of herbicides that has taken place in recent years. This book provides complete discussions of the sorts of chemical compounds that make up the herbicides, the nature of their effects on plants,

their impact on agriculture and on modern urban life, and provides an insight into the bright future for herbicides.

Plant Analysis and Fertilizer Problems. Edited by Walter Reuther Pp. xv 454. Published by American Institute of Biological Sciences, Washington D. C. Feb. 1961. Illustrated. \$8.00 Reviewed by V. Sauchelli.

This book comprises the proceedings of the third colloquium on plant analysis and fertilizer problems held at Montreal, Canada in August 1959 in connection with the 9th International Botanical Congress. Dr. W. Reuther is Professor of Horticulture at the University of California. He is editor and 43 internationallyknown biologists contribute to the discussions in this volume. These contributors represented scientists from 11 countries. The book, therefore, represents the thinking of world biologists on the current status of plant tissue analysis and the mineral nutrition of plants.

Present-day knowledge of the relationship between the concentration of nutrients in plant tissues and the growth and yield potentials of farm crop plants is admittedly inadequate. Such knowledge needs to be enlarged considerably before we can be satisfied that present practices of fertilizing crop plants can be applied universally. These proceedings emphasize the important advances made in the analysis of plant tissues as a supplementary aid to soil testing and the value of both methods as guides to the proper use of fertilizers.

The last chapter impressed this reviewer as containing some of the best contribution: it reports the frank discussions as to the limitations of leaf analysis and points up the kinds of research projects needed to help advance the techniques of plant tissue analysis.

This book will be useful to agronomists, college students and workers in fertilizer research and extension services. It is too technical for laymen.

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The demand for greater safety in use, along with economical and long-lasting insect control, is the reason why sales of SEVIN insecticide are growing so fast. The list of crops for which SEVIN is recommended is also expanding rapidly. SEVIN can be used close to harvest and helps reduce residue drift hazards because it can be used on many crops. SEVIN is available in spray or dust formulations for use on all these crops:

CROP	LAST APPLICATION DATE
Apples	1 day before harvest
Apricots	3 days before harvest
Bananas	1 day before harvest
Beans	No time limit
Blueberries	No time limit
Cherries	1 day before harvest
Corn ears, husks removed	No time limit
Corn fodder or forage (may be fed to dairy or m	7 days before harvest eat animals)
Cotton	No time limit
Cranberries	1 day before harvest
Cucumbers	No time limit
Eggplants	No time limit
Filberts	No time limit
Grapes	No time limit
Lettuce	3 days before harvest
Nectarines	3 days before harvest
Non-bearing citrus	Apply only when no fruit is present
Ornamentals, Shade Trees	s No time limit
Peaches	1 day before harvest
Pears	1 day before harvest
Pecans	Do not apply after husks split
Peppers	No time limit
Plums, prunes	1 day before harvest
Potatoes	No time limit
Strawberries	1 day before harvest
Summer Squash	No time limit
Tobacco	No time limit
omatoes	No time limit

ATTENTION DEALERS—Information on SEVIN can be obtained from your supplier or by writing to Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N. Y.

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Pound for pound, Celite gives you far greater performance than other inerts since only ten pounds give you a full cubic foot of extender. Celite gives you far greater value since it absorbs up to 50% more poison than other diluents on a dollar-for-dollar basis.

A Celite field engineer will be glad to give you the full story. Call your nearest J-M office or write Johns-Manville, Box 325, New York 16, N.Y. In Canada, Port Credit, Ontario.

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INDUSTRY'S MOST VERSATILE MINERAL FILLER





Equipment, Supplies, Bulletins

Air Pressure Packer

H. L. Stoker Co., Claremont, Calif., is offering a "Stok-Aire" air pressure packer for powdery, flaky, granulated, or pelleted materials. The new device is said to offer faster bag filling and tighter bags as compared with gravity packing methods.

Full details of the "Stok-Aire" are contained in a brochure available from the company at Box 112, Claremont.

Bulk Handling Booklet

Monsanto Chemical Co.'s Inorganic Chemicals Division, St. Louis, Mo., has published a booklet that describes the pneumatic bulk transport, storage, and handling of phosphate products.

The booklet lists and describes the equipment needed for a typical bulk handling system. It is available from William T. Beckman, distribution manager for the division, at 800 N. Lindberg Blvd., St. Louis 66.

Calspray Fertilization Film

The story of cotton fertilization from pre-plant to harvest is reported in a 10-minute film by California Spray Chemical Co., Richmond, Calif.

Chase Poly Insert Sleeve

Chase Bag Co., New York, is making available the "Chase Poly Insert Sleeve" in a complete line of sewn and pasted end mutiwall shipping sacks.

Key construction feature of the new line is a polyethylene film sleeve, fitted into the valve notch and extending inside the bag. Among the advantages claimed by the manufacturer are reduction both in siftage of fine materials and in contamination from outside.

Mobile Fertilizer Unit



To supply liquid fertilizer blending plants with their base material (8-24-0), Barnard & Leas Mig. Co., Cedar Rapids, Iowa, recently introduced a Mobile Fertilizer Unit, mounted on a 30-foot, completely enclosed trailer.

Special features include a hosecarrying rack under the trailer and quick-coupler attachments that make it possible for the equipment to be operated within minutes after it has reached its destination.

Capacity of the equipment, which includes B&L's Autobatch, Cooler, and Liqualizer units, is sufficient to process up to 30 tons of 8-24-0 per hour. The operation is continuous.

The local blender mixes potash and other materials as required to make the complete liquid fertilizer used in his area.

Attagel Data Sheet

A technical information sheet on the use of its thickening and stabilizing agents, Attagel 20 and Attagel 30, is being offered by Minerals & Chemicals Philipp Corp., Menlo Park, N. J. Included are descriptions of the typical properties, applications, and methods of processing viscosity curves, and several formulating examples.

Badger Liquid Meter

A positive displacement type of liquid measuring device is described in a bulletin available from Badger Meter Mfg. Co., Milwaukee, Wisc. The device uses an oscillating piston within a stainless steel chamber as the measuring element.

One of the special features claimed for the meter is the absence of a packing gland which results in complete confinement of the metered liquid within the measuring chamber.

Weed Control Guide

E. I. du Pont de Nemours & Co., Wilmington, Del., has prepared a booklet on industrial weed and brush control that is intended to be used as a guide in the planning of weed control programs. The booklet describes various herbicides and tells how they can be used.

Automatic Blending Plant

Agricultural Business Co., Lawrence, Kansas, is offering complete automatic blending plants for the production of either liquid or granular fertilizers. The plants feature automatic controls.

In addition, the company is offering a complete system of bulk handling, delivery, and application equipment. Full details are available from the company at Box 36, Lawrence.

Revised Garden Bulletin

A revised edition of a bulletin for home gardeners on insects and diseases of vegetables has been issued by the U. S. Department of Agriculture.

This edition of USDA Home and Garden Bulletin No. 46, "Insects and Diseases of Vegetables in the Home Garden," includes some new pest-control recommendations and brings all recommendations on the use of insecticides and fungicides into conformity with recent rulings under Public Law 518 (the Pesticide Amendment to the Federal Food, Drug, and Cosmetic Act).

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> . . 151/2% Nitrogen plus 20% water soluble Calcium

> Urea, Pelleted, coated 45% Nitrogen For dry application Max. biuret: 0.35% •

> Urea, Pelleted, not coated 46% Nitrogen Max. biuret: 0.35% . For liquid application

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"Strad-O-Lift" Trailers

Towmotor Corp., Cleveland, Ohio, has added a series of "Strad-O-Lift" trailers to its line of material handling equipment. The trailers are designed to pick up large unitized loads of all types of materials and transport them at highway speeds.

Available in standard lengths up to 40 feet, "Strad-O-Lift" trailers simply back up, straddle the load, lift and transport it to its destination. They hitch to standard truck tractors and are equipped with adjustable hydraulic lifting shoes which operate by power take-off from the tractor.

Morton Soil Fumigator

A self-propelled soil fumigator that can accurately apply chemical fumigants at rates up to 150 gallons per acre is being offered by the Agricultural Division of Morton Chemical Co., Chicago. The new unit is designed for fumigating in both greenhouse and field.

Young Mixers Catalog

A 12-page, illustrated technical catalog on horizontal mixers for free-flowing, granular materials is available from Young Machinery Co., Muncy, Pa. The new catalog features Young and Robinson mixer designs.

Design, technical, and dimensional data are included for mixers ranging in capacity from ½ to 500 cubic feet.

New Deming Liquid Pump

The Deming Co., Salem, Ohio, is offering a new Deming internal gear rotary pump that is said to be especially suited for metering service in the fields of liquid fertilizer, insecticides, herbicides, fungicides, and defoliants. The pump is fitted with a rotor made of "Fianite," a thermosetting material available exclusively in Deming Pumps. Full details are available from the company.

Caustic Soda Booklet

The U. S. Industrial Chemicals Co., Division of National Distillers and Chemica! Corp., New York, has prepared a 37-page booklet that is designed to furnish up-to-date, practical information about caustic soda. Included in the booklet are chapters on "Facts About Caustic Soda," "Determining Cost of Shipment," "Shipping Containers," "Handling," and "First Aid."

Force Flow Packer

St. Regis Paper Co., New York, is offering a new multiwall valve bag packer that features a pressure chamber which "densifies" materials so they pack faster and provide a more tightly filled bag. Called the Force Flow packer, the machine can handle 25- 10 100-pound sewn or pasted valve bags and is available in one- to four-tube models.

Stauffer Eptam Brochures

Stauffer Chemical Co., New York, has published four brochures that outline recommendations for the use of Eptam, a selective herbicide, in the northeast, south, midwest and west areas of the United States.

Motor Driven Pump

A direct motor driven 2-cylinder piston pump that will operate at pressures to 500 lbs. is being offered by Hypro Engineering, Inc., Minneapolis, Minnesota. A special adapter fits the pump for PTO drive on tractors with high-speed PTO shafts.

Called Hypro Series 5300, the pump is available in two sizes: 2 and 3 gallons per minute at 1800 RPM. Complete particulars are available from the company at 700-39th Avenue, N.E., Minneapolis 21.

Pulverizer Catalog

Bradley Pulverizer Co. has issued Catalog No. 64 that describes its line of screen-type and pneumatic roller mills for semi-fine and fine grinding of nonmetallic minerals. The catalog is available from the company at 123 South 3rd St., Allentown, Pa.

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One bag shattered ... the other has two-way stretch

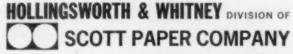
The unbroken bag is made of H&W's new highstrength Expanda-Kraft.

As the lift truck braked to a sudden stop, both bags flew through the air and fell hard against the concrete floor. The regular kraft bag split open — note the spilled flour. Yet, look closely at Expanda-Kraft. Not a sign of breakage! Naturally, both bags were identical in basis weight and number of plies.

Expanda-Kraft is stronger, because it's made by a special roll-crepe process. It's resilient, has twoway stretch that soaks up shock. Available in white, semi-bleached and natural.

Expanda-Kraft comes in 40, 50, 60, 70, 80 and 100-pound basis weights. For samples and information, write Hollingsworth & Whitney, Division of Scott Paper Company, Chester, Pennsylvania.

EXPANDA-KRAFT



New Fertilizer Package

Alton Box Board Co., Alton, Ill., is offering a new type of packaging for fertilizer products that require both multi-color halftone printing for merchandising appeal and, also, protective strength for longer shelf life. The product, named Elite Flute, is said to give corrugated cardboard the same printability of light weight folding cartons. It is one-sixteenth of an inch thick.

Fly Repellent Booklet

Control of flies, including the face fly, is described in a 35-page formulator's booklet now available from Crag Agricultural Chemicals, Union Carbide Chemicals Company, Union Carbide Corp., New York.

The booklet contains complete information on Crag Fly Repellent, giving, in particular, suggestions on effective and economical formulations.

Packaging Machinery Folder

A four-page folder that describes the complete line of packaging machinery offered by the Stokes & Smith Plant of Food Machinery and Chemical Corp., has been prepared. Specifications, features, and illustrations are listed for ten types of equipment. The folder is available from the company at 4900 Summerdale Ave., Philadelphia 24, Pa.

Vibro-Energy Separator

Southwestern Engineering Co., Los Angeles, has published a series of case histories that indicate how screening problems can be solved with the company's Vibro-Energy Separator. Among the advantages claimed for the separator are increased production rates, improved separation efficiency, and upgraded products. The complete report is avaliable from the company at 4800 Santa Fe Ave., Los Angeles 58, Calif.

Moores Offers Doloxide

Moores Lime Co., Springfield, Ohio, is offering "Doloxide," a powdered magnesium calcium oxide. When used in combinations with powdered kaolin, Doloxide is said to successfully prevent the caking of granulated fertilizers.

Texas Gulf Sulphur Manual

Texas Gulf Sulphur Co., New York, has released Section V of its Sulphur Manual which was issued with four sections and an addendum a little over a year ago. Section V, entitled "Sulphur in Plants and Soils," discusses uses of sulphur and its derivatives in soils as plant nutrients and soil conditioners. The section was prepared and edited by Dr. Firman E. Bear.

Acid-Resistant Laminates

Tarrant Co., Owensboro, Ky., is offering epoxy laminates reinforced with fiberglass for use in the construction of acid-resistant containers for fertilizers and pesticides. The company offers two resin-convertor systems to laminators.

New Products Bulletin

Soiltest, Inc., Chicago, Illinois has issued a 12 page bulletin on new products for engineering tests. These product are used by engineers, scientists, architects, governmental agencies, testing laboratories, utility companies and similar organizations. Over 35 new testing devices are illustrated and described. Copies of the bulletin may be obtained by writing to Soiltest, Inc., 4711 West North Avenue, Chicago 39.

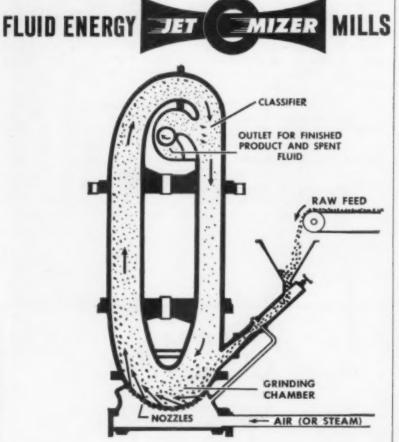
Dry Processing Equipment

Sturtevant Mill Co., Boston, Mass., is offering an eight-page bulletin that describes the company's dry processing equipment. The literature covers the full line of laboratory and production equipment. It includes information on crushers, grinders, pulverizers, micron-grinders, air classifiers, granulators, blenders, mixers, feeders, screens, elevators, conveyors, and mechanical dens and excavators.



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(Formarly known as the Wheeler-Stephonoff Mill)

Drum Gauging Chart

A wall-chart for determining how much liquid is left in a partially used drum has been prepared by the U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corp., New York. The chart converts wet inches of stick measurement into gallons of liquid and covers both 55-gallon drums and 30-gallon drums stored in either a vertical or horizontal position.

Totalizing Flow Meter

B-I-F Industries, Providence, Rhode Island, is offering a bulletin that describes its Model 380 "Propeloflo" meter, a propeller type, totalizing flow meter. The meter is intended for metering water and other liquids in water works and chemical or process industries and is as easily installed as a length of pipe.

MANAGING FOR PROFIT

(From Page 26)

The market analysis section also reviewed Makmor's movement of the plant food to market, including sales activity of the company's dealers in the 16-county area.

Sales Direct to Farmers

By totaling the dealer volume and subtracting from the county total, the market analysis section found the total sales direct to farmers. Of the total county consumption of 10,900 tons, only 5,200 tons were sold through dealers, and 5,700 tons were sold direct. Makmor sales were 780 tons to dealers, but only 90 tons to farmers. They had not realized that the industry had been selling this high a volume direct to farmer agents or farmers.

The market had apparently moved away from the Makmor established trade channels, and no real attempt had been made to get this business. They had felt they were doing well in County B, since sales to dealers there had been picking up substantially in recent years.

By examining the map, showing dealer and competitor location, and by analyzing county activity, Makmor had a base for determining its sales potential. They decided that while Makmor currently was supplying only 13.1 per cent of the mixed fertilizer to the 16-county market, by stepping up direct sales to farmers, as well as to dealers, Makmor possibly could make a substantial (21.3 per cent) increase above current sales, that would involve an additional 3,620 tons.

As Heimberg summarized: "With the aid of market analysis, Makmor now knows his marketing problem. He can now go on to plan marketing strategy. The analysis provides the only solid base for establishing the size of his sales force; delineating the territory to which each salesman will be assigned; setting sales goals and establishing sales compensation programs."

Cutting Production Costs

A FIRST check of Makmor's plant operation showed the company had about as inexpensive formulas as could be written for almost all of its grades. Yet, the company was \$8,564 overplan for production costs.

IMC's technical service representative, Dick Powell, was consulted to study Makmor's production processes. He noticed that sulfuric acid was used unnecessarily to achieve granulation in the low nitrogen grades of fertilizer made by Makmor. The acid was not always needed to absorb excess ammonia and was merely there to permit the development of heat and some granulation. A study was made, and it was found that perhaps a steam boiler could be installed which would permit removal of all or a portion of the sulfuric acid in some of the low nitrogen grades and still achieve the necessary granulation at a lower cost. The removal of sulfuric acid, plus the additional use of normal super, lowered the final formula cost. Mr. Powell pointed out however that further work would need to be done under actual operating conditions to refine the suggested formula. But based on previous experiences, it was felt possible to make the savings realistic. Humidity conditions, moisture, content of raw materials, and other factors would, of course, affect the amounts of steam used in each case.

Another area of formula investigation was the consideration of ROP triple super rather than a coarse triple super for all grades. "Lets look at the dollars and cents comparison of coarse, triple and ROP triple," said Mr. Powell. "The formula used by Makmor currently for making their triple superphosphate is a good one, wherein they are securing 9 units of nitrogen from solution.

"By substitution of ROP triple for coarse triple, with the same amount of liquid nitrogen being used, the amount of sulfuric acid is lowered by some 25 lbs. This eliminates the expense of the sulfuric acid and permits the use of more low cost normal super. The net result is a saving of 55¢ per ton for the use of ROP triple. It is also possible by use of the ROP triple to increase the amount of solution being used, since better absorption exists, and there is less chance of oversize being formed. Consequently, it may be possible for them to increase the amount of solution and frequently this has been done from 9 units of solution to 10 units of solution."

An investigation of the cost of producing their own superphosphate (in the anticipation of expanding their operations and possibly selling super to other manufacturers) showed that unless a cheaper source of sulfuric acid could be obtained, there would be no point in their expansion in this direction. Makmor pays about \$1.031/2 per unit of P2O5 for their superphosphate and at the current rate of \$24 per ton of 66° Baume sulfuric acid, it would cost them approximately \$1.03 per unit to make their own super.

Several other areas of savings in production operations were



checked out. "Shrinkage" losses were reduced by:

 the simple process of improved housekeeping — attitudes of casual disregard or lack of regular housekeeping policies, it was pointed out, can mushroom into substantial losses.

(2) checking the continuous volumetric and gravimetric meters. A common metering error (as found in the Makmor case) is the variation caused by solution temperature changes, Most rotameters are factory calibrated for solutions at a temperature of 60° F. Consequently if the liquid metered is at a different temperature, its specific gravity will be different than that for which the meter was calibrated and an error can be introduced. It will be on the low side if the specific gravity is greater than contemplated.

(3) Setting up a systematic quality control program for checking bag weights. Makmor had assumed its bagging operations were adequate, but following the discussion with Dick Powell, they learned that losses occurred in bagging not only represented waste materials, but the cost of processing this material as well. Producing 26,000 tons per year, it may be assumed that about 60% of the material is shipped in bags. This would represent 15,600 tons of bagged material, and as little as one pound excess per 80 lb. bag could amount to 195 tons over the course of a year.

Making a thorough air (4) flow study and dust collection efficiency investigation. Makmor knew their dust collection system was not operating efficiently but were not sure how inefficient it was, or where the source of their problem was. The study showed the efficiency at somewhere around 50%. Mr. Powell pointed out that in a similar plant, operating at 20 tons/hour, as much as 1700 lbs. per hour of dust can be collected from the dryer and cooler collectors operating at 90% efficiency. Translating this data into Makmor's operation, it was estimated Makmor could be losing in the neighborhood of \$14,700 a year just by the inefficient operation of the cyclone collectors. The source of trouble with the Makmor collectors was found to lie partly in new duct work which had changed the air flow, — and partly in improper maintenance on the discharge gate on the cyclone.

In checking out Makmor's operations, Powell also suggested a revision of the material handling program, — including routing of raw materials, bin location of materials for the most popular grades, and location of storage of the four most popular grades with respect to shipping facilities. One area meriting investigation after the season was over, — was to put together figures on the cost versus savings of installing an under-the-truck unloading system. With this system it was hoped to obtain a



reduction in manpower, decrease unloading time, and decrease shrinkage.

Still another area earmarked for investigation was the ability to bag and load bulk simultaneously off one of their shipping mills. It was agreed that they should raise their elevator and install a holding hopper over the automatic packer. By attaching a bypass chute to the elevator, they could then load bulk simultaneously if they were on the same grade, and intermittently while on different grades.

The study of Makmor's operations resulted in savings, improvements in plant efficiency. Most important, however, is the fact that these improvements were not to be made and forgotten. Mr. Makmor felt that he had learned a costly lesson in permitting some of the inefficiencies to creep into his organization. It was agreed that a yearly review of all of these facts would be essential and attempts would be made to evaluate all corrective measures instituted.

By making changes in production procedures such as those outlined above, it was indicated that substantial savings could be effected and efficiency of plant operconsiderably improved. Other sections of the seminar pointed to similar savings through improvement in credit and collection policies, revision of insurance programs, improving purchasing procedures, reducing sales costs, etc., - the common goal of all the participants being to show typical fertilizer manufacturers how they can increase profits through efficient and intelligent management.*

SALES PROGRAM

(From Page 43)

although its line of products and production facilities had been recently expanded, little had been planned to help its salesmen do a better job. The company turned to a well-known management consultant firm for aid in appraising the situation and organizing a program. At this point, Glenn

ing discussions with territory man-Rouse, formerly a district manager for Niagara on the west coast, was brought to the Middleport headquarters to serve as coordinator.

For several months, a representative from the management consultant firm and Glenn Rouse shared the responsibilities in traveling with selected individual salesmen to determine those things the salesman did, which were producing sales—and ways to get more salesmen to do these things. In addition, interviews were held in the field with customers, prospects, state and federal research and extension personnel, and others influencing the buying decision.

Based on the extensive discussions and analyses, and especially the work with territory managers, a program was developed to capitalize on major improvement opportunities. This included the development of a guide for leadagers-a guide which provides for maximum flexibility.

Once the plan was set up, a "sample" conference was arranged for a number of salesmen in the region in which Niagara's Middleport headquarters are situated. The purpose was to try out the program and also to get an expression of opinion from the salesmen themselves as to how helpful the conferences were. Response was favorable, and the program was launched on a full scale.

Evaluating Results

Although it is difficult to measure in dollars and cents the value of a sales personnel development program, Niagara feels that the improvement in performance of many individual salesmen is too great to be coincidental. One salesman, for example, left the four-day territory managers' conference filled with enthusiasm and expressed the fact that many of the techniques presented there were



news to him. One year later, his sales volume had increased 87.5 per cent. Niagara feels that its estimate of a five to seven per cent total sales increase for 1960, directly attributable to the program, is a conservative one. It takes many variables into consideration and does not assume that the entire increase for the year resulted from the program.

Niagara's sales development program has improved communications considerably, the company reports. Everyone—from top management to individual salesman—is aware of regional plans and programming, and the established goals.*

ORCHARD TOURS

(From Page 50)

Faster knockdown and the same residual life probably results from the finer grind of the flowable formulation, Mr. Deichler commented. He urged that growers go on a preventive program and not wait until they are in trouble with mites before calling for help. When the mites have built up webbing protection, it is difficult to develop a spray program which will control the pests and still meet residue regulations.

David H. Brannon, Washington State University extension entomologist, seconded Mr. Deichler's recommendation of a preventive program.

"We're going to have the same problems next year, and we'll have nothing new to work with," he declared. "We aren't going to have new materials at our elbows as we once did."

Concerning TEPP, which some of the growers will be forced to use, Mr. Gervais made a strong plea for caution in handling it, and offered a suggestion.

"Treat TEPP like dynamite—
it can knock you flat just as it does
insects," he declared. When TEPP
is included in the spray tank, it
should be added last, just as the
grower is ready to start for the
orchard. It breaks down rapidly
in water, so putting it in the tank
last gives it a little longer life, as
well as relieving the grower of
some danger of exposure to the
fumes.

Wearing a respirator and protective rubber clothing is a "must," because during hot weather the skin is wide open to absorb the deadly chemical, he told the orchardists.

"I'm not trying to scare you," he added. "I want you to be safe. In the last two years more and more people have become sick from spray poisoning. The warning on the label isn't there just to be pretty. It's there to save your life."

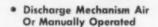
Although the codling moth is causing trouble for some orchardists, this is generally only where the grower did nothing last year or this to control it, speakers pointed out. The residual action of new sprays is better than it has been in the past, but a couple of weeks of

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warm weather can bring out the threatening third brood. Growers are advised to be on the watch for signs of moth activity at the time they are engaged in thinning, irrigating or other orchard work.

Tedion looked "real good" until a month or a month and a half before the meeting, Mr. Holgarth reported. Last year, growers were pleased with the results obtained, and were again this year, with the first spray. He attributed lack of control of mites to three major things:

1. Hot weather, which caused the mites to build up rapidly. (A week to 10 days is all that is needed for a complete life cycle, Mr. Brannon pointed out.)

2. Some resistance to Tedion by the mites.

3. Using Tedion in extremely low dosages. Some growers were applying only two pounds of actual Tedion per acre. "That's an awful small amount to spread over that much area," Mr. Holgarth re-

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James A. Flood, Manager

marked. There has been a tendency to cut down the rate of application from the 16 pounds recommended.

Eggs laid in the webbing hatch out, and the mites crawl around under this protection until they have reached an age where they are unaffected by the chemical.

Oil (either two quarts of supreme oil or one gallon of summer oil) helps considerably in breaking down the webbing, but no oil is recommended with parathion, or most of the other organo phosphates, because of the toxicity hazard, as well as for the other reasons mentioned previously.

Another word of caution concerning residues was issued. Government inspectors possibly will be more numerous and disinclined to overlook failures to keep within residue limits.

"Oil is ticklish this time of the year," Mr. Brannon commented, "particularly with DDT. Kelthane is not too far from DDT in chemical structure, so we would not recommend oil with it either."

Four things noted in failure to obtain control of orchard pests, as listed by Gervais were:

1. Too much speed in application. "The slower you can drive your tractor, the better off you are." Too low gallonage-it should be 600 to 700 gallons per acre. Failure to consider weather factors in connection with spray application. A physicist from Bayer's laboratories in Germany, during a recent visit in Yakima, pointed out that a 200 micron droplet had a life of six seconds when the temperature was 77° and the humidity was 40%. "You can guess how long a droplet lasts in 90° temperature and 10% humidity" (common in central Washington during the summer). Some spray droplets are only 40 microns. "You have to have sharp particles in your spray material and hope you'll spear the insects," Mr. Gervais quipped.

 Letting the insects get a foothold. "If you have faith and confidence in your fieldman, follow his suggestions. If you don't, get another fieldman."

Sturtevant Equipment

NEWS



Sturtevant Pulver-Mill® does in one step what used to take two

Designed for fine grinding into the micron range and precise end product classification - all in a single operation, Sturtevant Pulver-Mills are proving highly effective for pulverizing soft to medium hard non-metallic materials. . In Ag chemicals, Pulver-Mills have helped one blue chip company enter and compete profitably in the lucrative 95% 325 mesh market . . In the milling field, too, Pulver-Mills are increasing yield while also improving uniformity of particle size ... And pilot runs at Sturtevant's laboratory indicate that Pulver-Mills can lower production costs, improve quality control, in the pulverizing of dozens of other materials. . Air-swept principle of operation (special intake vane design "whirls" vertical air flow) enables both control of attritional heat and integral air classification of end product. Precise selection of desired particle size is accomplished by an adjustable selector bar system. Unique deflector wall design "bounces" any partially reduced material back into the Pulver-Mill grinding zone makes the reduction process (revolving impactors passing between fixed wall impactors) fast, highly efficient. Now available in three models with capacities ranging from several hundred pounds per hour to 71/2 tons per hour, Sturtevant will welcome the opportunity to test-run any soft to medium hard non-metallic material you may be working with.

> For further information, send for Sturtevant Bulletin No. 093. Write Sturtevant Mill Co., 123 Clayton St., Boston 22, Mass.



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3. Failure to get thorough coverage of the trees. "When the trees are brown at the tops, either your rig hasn't enough power, or you're driving too fast.'

4. Too many "experts" among the growers. "Some 'know' more than the men who have spent a lifetime in studying the matter."

"The cost of your spray material will be determined at the end of the season in the cull bin. You

don't make money, you save it. It costs about \$5 an acre to run a spray rig through the orchard, in addition to cost for materials.

"Keep in mind, if you plan to use oil, that washing equipment in the packing sheds is not being operated to remove plastered-on spray combinations. If you put those on, we may have to go back to the hot water acid baths that weren't too good for our fruit."

Dr. Griffith Quinby, senior surgeon at the U.S. Public Health service toxicological laboratory in Wenatchee, reported that tests were being made of human milk to determine what percentage of DDT was being carried. He asked growers to report names of nursing mothers who would be willing to cooperate in the program by submitting samples.**

PESTICIDE SITUATION

(From Page 20)

tives, are estimated at \$25 to \$30 million.

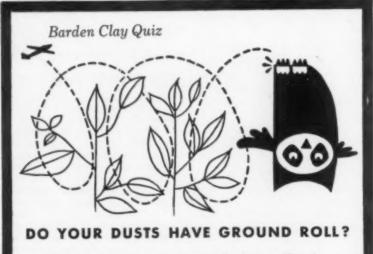
Herbicides

Over 50 million acres of agricultural land were treated chemically for weed control in 1959, more than double the area to which herbicides were applied tenyears previously. Small grains led with 19,475,000 acres treated, costing \$34,861,000 for herbicide application. Corn was second with 16.127.000 acres treated at a cost of \$31,222,000. Total cost of treating 50,452,000 acres was \$136,743,000.

Sales of agricultural herbicides increased 7 per cent in 1960 over 1959, according to a non-government survey. Pre-emergence products showed a 33 per cent increase and post-emergence gained 11 per cent. Offsetting these gains materially was a drop of more than 40 per cent in use of chemicals to kill weeds and brush in pasture and non-crop areas. Appreciable gains in weed control in grain crops were reported also by the Minnesota Division of Plant Industry.

U. S. exports of herbicides in 1960 were valued at \$9,662,000, compared to \$6,715,000 in 1959. During the first three months of 1961, herbicide exports had a value of \$3,835,000.

The volume of arsenical compounds used in weed control has expanded rapidly in recent years. Organic arsenicals for crabgrass control went to 5,000 tons in 1959. Sodium arsenite is used extensive-



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ly as a weed killer and harvest-aid chemical. Arsenic acid (75 per cent) is applied in Texas and Oklahoma as cotton desiccant.

Production of both 2,4-D and 2,4,5-T acids rose to record levels in 1960. Exports gained heavily over 1959 to reach 8,796,000 pounds (acid basis). During the first three month of 1961, exports, amounting to 2,028,000 pounds (acid basis), maintained the 1960 rate. The current domestic market for 2,4-D has been estimated at 29,1 million pounds a year.

Fumigants

Major producers of liquid grain fumigants sold over 4,300,000 gallons (about 51,800,000 pounds) in the year ended September 30, 1960. This quantity appears about 15 per cent off from the 1959 level because of carryover; dry, relatively insect-free grain; and movement of grain into export in 1960. U. S. exports of fumigants in 1960 amounted to 4,686,000 pounds valued at \$1,340,000, a level somewhat higher than in the previous year.

Dust, Carriers, Diluents

Sales of talc, pyrophyllite, and various clays for the formulation of pesticides were 24 per cent greater in 1959 than in the previous year. Sales of talc and soapstone in 1960 for this purpose amounted to 95,108,000 pounds and of pyrophyllite 67,662,000 pounds.

Miscellaneous

In these days of highly efficient insecticides packed in pushbutton, aerosol containers, it is interesting to note that the volume of fly-paper ribbons imported annualy to the United States has increased greatly. Imports in 1958 amounted to 12,160,000 units. In 1960, 14,042,000 units were imported, mostly from West Germany.**

PESTICIDE DATA

(From Page 16)

chains? In many cases, if not most, are these not more lasting and ef-

fective than insecticidal losses? How many of us have bothered to study total ecological effects of game management practices, or even concerned ourselves with the fact that more than just a deer or muskrat lives in a specific environment? Aren't we all, including the chemist, entomologist, and agriculturalist, a bit egotistical and selfcentered? If we are all going to ride in the same canoe, trying to go up the same polluted stream without a paddle, why not recognize that the responsibilities for the safety and pleasantness of man's biological world reflect the interests of every walk of life, and warrant the integrity and cooperation of every profession related to this problem before us.

There are those who praise the efforts of the ultras, that these are the factions which keep us all conscious of what might really be if we take no precautions. Frankly, this attitude leaves me cold; life is too short to have to fight the extremes at both ends of the swing of the pendulum.

It seems apparent that we never learn from past experiences, yet this we preach in the classroom, to employees, and to the general public. Are there not examples in man's history to suggest that maybe past techniques of opposition, such as exemplified by complete condemnation, riot, and strikes, are not productive, that they never create an environment for sound and honest evaluation, and that they create regulations or laws by which no one wishes to discipline himself? Panaceas never bring solutions, only bitter memories, enemies, and gross misunderstandings. As a result, honest and justified actions do not result, because we base decisions on post mortems.★★

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WAREHOUSE

(From Page 17)

since it is not rigid and literally moves away from a blow. Even if the fabric is torn accidentally, the opening will not enlarge, due to the high tear-resistance of the fabric, and a patch can be cemented in place at any time.

Another utilization of the air supported structure principle can be found at Hercules Powder Co.'s urea plant at Hercules California, where a sixty-foot diameter storage tank is covered by fabric held in place by a clamping ring. The

cover is kept inflated by a blower delivering about the same pressure as a household vacuum cleaner. The fabric reportedly costs less than one fifth the cost of a rigid aluminum roof and it offers a higher dome for easier servicing of the tank and mechanism.**

ROUND TABLE

(From Page 66)

secticides, and *T. confusum* appeared to be extremely sensitive to repellent action.

In tests with malathion, S. oryzae was more susceptible than T. confusum as indicated by results from toxicity tests. The influence of moisture content and storage temperature on the persistence of biologically effective malathion deposits on wheat was recognized by reduced mortalities of test insects with increases in temperature and moisture content. Repellency indicated for malathion applied in the tetrachloroethylene

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solution formulation was considered to be due primarily to the solvent used. Residues of malathion persisting on whole grain at various intervals after application of spray decreased with time; the influence of moisture content and storage temperature on the persistence of residues was indicated by the results from chemical analyses for residues on whole grain. In milled samples the larger amounts of malathion residue were recovered from bran (including germ), shorts, and wheat middlings. Very little malathion carried over into the flour.

Methoxychlor treatments failed to kill insects in toxicity tests and demonstrated little or no repellency toward the rice weevil, but they were highly effective in repelling confused flour beetles. Larger amounts of methoxychlor residues were recovered from bran than from other milling fractions, but considerable methoxychlor was recovered from flour.

Negative results were obtained in toxicity tests with T. confusum exposed to wheat sprayed with the synergized pyrethrum formulations. Erratic results, but recognizable toxic effects, were recorded in tests with S. oryzae. Mortalities of S. oryzae declined rapidly in tests made after storage of synergized-pyrethrum-treated wheat for more than 1 month after application of sprays. Results from repellency tests conclusively illustrated repellency of the synergized pyrethrum sprays to both species of test insects. Residues persisting on whole grain at various intervals after application of spray decreased with time. Results from chemical analyses for piperonyl butoxide indicated that cleaning operations used in this study were not highly efficient in removing chemical residues from treated wheat, probably because most of the insecticide retained by wheat was in the pericarp and endosperm. Residues recovered were greater in bran than from the other milled fractions. but recoveries from flour were considerably higher than expected.

Small diffierences observed between treatments in flavor and odor evaluation of bread made with flour milled from wheat treated with the insecticides tested were not considered of significance.

Abstract of paper by R. G. Strong, D. E. Sbur and R. G. Arndt, appearing in the Journal of Economic Entomology. Vol 54, No. 3, pp 489-591 (1961).

LISTENING POST

(From Page 63)

higher dollar returns per acre than unsprayed plots.

Control might have been improved if the spray program had been started two weeks later, according to Dr. Lucas. He commented that dependence of brown spot occurrence on weather may make proper timing of spray applications in the field difficult.

Control of Head Smut

E. S. Luttrell and J. P. Craigmiles (3), of the Georgia Experiment Station, reported the results of investigations on head smut (Ustilago bullata) of rescue grass (Bromus willdenovii), including studies on the effectiveness of chemical seed treatment for control of the disease. The grass provides good permanent or semi-permanent winter grazing in the Southeast. In first-year plantings, infection with head smut is common. The disease causes heavy direct losses in seed yield, all seed in smutted heads being destroyed. Control of the smut is essential in crops grown for seed production, where harvesting, storage, and replanting practices provide very favorable conditions for inoculation and infection. In forage plantings, natural reseeding is less favorable to spread of the pathogen and incidence of infection usually decreases after the first year; nevertheless, the reduced production of seed for natural reseeding, as well as appreciable losses in amount of forage produced, must be considered in plantings designed for grazing.

For the seed treatment experiments, Luttrell and Craigmiles



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That's not all. With KLM air cargo you don't have to tie up money for yourself. KLM Royal Dutch Airlines, 609 in large inventory stocks. You can replace orders fast. Fifth Avenue, New York 17, New York. used the highly susceptible Chapel Hill variety of rescue grass. Seeds artificially inoculated with smut spores were treated with N-ethylmercuri) -p-toluene sulfonanilide 7.7% (Geresan M), methylmercury dicyandiamide 2.2% (Panogen 15), thiram 75% (Arasan SF-X slurry), and dichlone 50% (Phygon). At harvest time, the percentage of smutted heads was 0 in the dichlone and Panogen 15 plots, 2 in the Geresan M plots, and 38 in the thiram plots, compared with 79 in untreated plots.

According to Luttrell and Craigmiles, there is evidence that the smut fungus includes more than one strain and that available smut-resistant varieties of rescue grass may not hold up against all strains. They concluded that the effectiveness of proper seed treatment justified its use for smut control and permitted choice of varieties on the basis of desirable agronomic characters. They added that their tests did not show any stand improvement to result from seed treatment.

Markedly Effective Antibiotic

In greenhouse studies (4), reported by B. C. Smale and W. D. Montgillion, of the Crops Research Division, and T. G. Pridham, of the Northern Utilization Research and Development Division, Agricultural Research Service, United States Department of Agriculture, bean rust (Uromyces phaseoli var. typica) was controlled with phleo-

mycin at very low concentrations and the plants were not injured by concentrations several hundred times as great. Results of applications to roots, stems, and primary leaves of Pinto bean plants indicated that the antibiotic possessed both therapeutant and protectant qualities. Translocation of the antibiotic apparently was associated with the transpiration stream.

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PEST ROUNDUP

(From Page 61)

the Rio Grande Valley of Texas, was becoming more evident in other areas by the latter part of the month. Populations were heavy in the Lower Rio Grande Valley by late July and infestations were on the increase in other sections of the State, with emergence of the second generation. Populations in Louisiana ranged from light on young cotton to very heavy on older cotton in the southewestern portion of the State. There was a

steady increase of the weevil in all cotton-growing areas of Oklahoma and some localized "hot spots" were reported from the Mississippi delta section. Conditions were ideal in Tennessee for a buildup of the pest, with the heaviest infestations being in the southeastern corner of the western area.

The boll weevil was the major pest of cotton in South Carolina in late July. Populations were low in areas of North Carolina where early controls were applied. However, counts were high in sections where these practices were not followed.

Lygus bugs were a problem on cotton in some areas of Arizona and heavily damaged many fields in northern Alabama.

The face fly continues to spread both to the south and west. During July, this livestock pest was reported for the first time from Georgia, South Carolina, South Dakota, and Wyoming. A number of first county finds also were reported from Norh Carolina, Iowa, Illinois, and Kansas.

Forest insects were responsible for some control programs during June. Controls for the jack-pine budworm were applied to 32,000 acres of jack-pine in four northwest Wisconsin counties late in the month. During June, controls for the spruce budworm were applied to 48,000 acres in Aroostook County, Maine. Outside of the control area, appreciable defoliation on an additional 50,000 acres was expected.*

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GRUMMAN AG-CAT

(From Page 54)

its hopper, in handling bulky loads."

Among the interesting figures found in the Grumman survey are the relatively few hours reportedly required for repairs. This survey, of course, did not cover a large enough selection of aerial applicators to be really conclusive, but it does indicate that the Ag-Cat has earned the confidence of those operators who do own it.

Among improvements made on the Ag-Cat by Grumman during the past season are a new welded aluminum hopper, new corrugated side skins for extra stiffness, and a new "airfoil" spreader with selfcontained rotary gate of stainless steel. In addition, the Carboline B-10 resin paint and primer has been replaced with an epoxy resin (#1012) primer and a Urethane resin finish paint. A new cast aluminum sump with hinged door for quick full-throat emergency dump also has been installed. The door is adjustable at eight points to assure liquid seal.★★

FERTILIZER VIEWS

(From Page 102)

that most farmers are not now using the total amounts of fertilizer recommended by agricultural authorities in every state. Why then do so many sales departments in our industry get panicky along about mid-April because for some good reasons all the inventoried fertilizer in the plant warehouses has not moved into the trade channels?

Mr. Foy is right: Slashing prices in the belief that it will stimulate sales, create new business, and extend the market is a snare and a delusion. Let's cut it out.

WASHINGTON REPORT

(From Page 69)

tion to cooperate in making a motion picture on how to apply pesticides safetly and effectively.

The other is the scheduled appearance of Health Education and Welfare Secretary Abraham Ribicoff at the National Agricultural Chemicals Association's annual convention at The Homestead, October 29 - November 1.

Industry leaders in Washington view both events as giant steps forward toward resolving public concern over the health aspects of the use of pesticides. In one sense, these events mark the coming of age of the industry.

Agricultural chemicals now appear to be reaching public acceptance as necessary and beneficial tools of modern society, taking their place along with automobiles, electricity, and aircraft in the public mind.

In another sense, these developments are a credit to the farsighted and reasoned approach of NAC and the industry to evidences of public resistance fed by unreaoned and ill-based attacks by food faddists and others.

Another major problem — the apparent conflict of interest between wildlife enthusiasts and those who make and use pesticides — also is moving into an era of collightenment. As an evidence of gains in this area, another NAC convention speaker will be Dr. D. A. Spencer, Research Biologist, Wildlife Research Center, U. S. Fish and Wildlife Service, Denver, Colorado.

The Wildlife Research Center has embarked on a program of testing pesticides for their possible effect upon wildlife and their possible use in wildlife management practices. The industry, which has developed a number of chemicals and practices whose use benefits wildlife, is cooperating in this forward-looking program.

NATA Optimistic

Despite a slow start because of the weather, aerial applicators are reporting a good season this year. They will be going into the annual National Aviation Trades Association convention in Washington, D. C., December 5-7, with greater optimism than they have had for several years.

NATA Executive Director Bob Monroe reports that, as a change of pace, the applicators will take the rostrum during their meeting and explain their views and

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programs to members of the Federal Aviation Agency who will be invited to attend.

Top items of discussion are likely to be the new Air Agency certification of applicators by FAA - due to come into effect within a few weeks of the NATA convention - NATA's new pilot rating card system, and questions concerning the improvement of chemicals and practices to make application results more effective.

Location of this year's convention in Washington will enable more members of the staffs of the National Agricultural Chemicals Association and the National Plant Food Institute to attend. A special feature of the meeting will be a panel discussion on how applicators, and other in general aviation. can improve their relations with local news media.

Wildlife Projects

Farmers for the first time will be eligible to get federal matching funds for practices which benefit wildlife. The funds will be available under the Agricultural Conservation Program.

Exact details on how this new program will work are yet to be developed, but plans call for allowing state and local authorities, working in cooperation with state wildlife agencies, to develop projects best suited to their particular areas.

Wildlife sources indicate that the projects will include habitat or cover plantings, marsh management and ponds. To be eligible. however, the projects also must have soil or water conserving benefits. Federal ACP cost-sharing will be up to 50 percent of approved projects.**

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NEWS BRIEFS

WILLIAM F. O'BRIEN has been named superintendent of the F. S. Royster Guano Co.'s Madison, Wisconsin, factory.

Lewis Johnson, secretarytreasurer of the Tri-State Fertilizer Co., Burlington, Iowa, was killed in an automobile accident recently. He was 33 years old.

BRACKMAN-KER MILLING CO. will build a fertilizer manufacturing plant at Langley, B. C. Completion is scheduled for this fall.

THE NEVADA FERTILIZER CO., with headquarters at Nevada, Mo., has opened a branch plant in Iola, Mo.

"SPADEWORK FOR PROFITS" has been selected as the theme for the Eastern Lawn, Garden & Allied Products Trade Show to be held at the Coliseum in New York City. October 20-22.

CHARLES H. FREEMAN, who formerly was in the manufacturing department of Armour Agricultural Chemical Company's Dallas, Texas, plant, has been appointed plant manager of the company's

fertilizer plant in Columbia, South Carolina.

CHEMICAL CONSTRUCTION CORP., New York, has been awarded a contract by Nihon Gas Kagaku Kogyo KK, for the redesign of a urea plant at Niigata, Japan. The present urea capacity of the plant is to be increased from 80 metric tons per day to 150 metric tons through use of Chemico's total recycle urea process.

CREST CHEMICAL Co., a new firm which will manufacture insecticide sprays and package fertilizers, is being formed in Clearwater, Fla., by Gerald Tinney. Mr. Tinney formerly was with Haley Chemical Co., Dade City, Fla.

BRUCE E. CHAVALIER has joined the Terra-Lite Division of Western Mineral Products Co., Minneapolis.

JOHN V. N. DORR has resigned from the board of directors of Dorr-Oliver Inc., Stamford, Conn.

CHEMTRON CORP. Phillipsburg, New Jersey, has changed its name to Pearsall Chemical Corp.

Pearsall Chemical owns and operates plants in Brainards, N. J., and in Sarnia, Ontario, and LaPorte, Texas.

JACOB WHITE, president of the Nitrogen Division of Allied Chemical Corp., New York, has been elected a member of the National 4-H Service Committee.

AC

HEYDEN CHEMICAL DIVISION, Heyden Newport Chemical Corp., has started production at a new fumaric acid plant in Garfield, N.J.

J. T. Braxton, assistant secretary of the Bemis Bro. Bag Co., St. Louis, has been elected secretary of the company. He succeeds Ronald Ramsey who is retiring.

WILLIAM G. SLUGG, founder and chairman of the board of W. G. Slugg Seed & Fertilizer, Inc., Milwaukee, died last month. He

was 78 years old.

EDITORIAL

(Continued from Page 13)

familiar with this growth of the international fertilizer industry, for in many cases they are doing more business overseas than in the domestic market, and are actively seeking more such commissions. More recently a number of suppliers of fertilizer raw materials have exhibited an increasing interest in the export market. Several of them, as a matter of fact, are currently surveying the possibilities for sharply expanding their sales in the world market by shipping raw materials to some of the many new plants now building.

A few years back, when we were told that America might have to help feed the world, we were thinking in terms of exporting foodstuffs. It begins to look now as if we will end up doing the job more efficiently by exporting fertilizer plants and equipment, a portion of the raw materials and a share of our manufacturing "knowhow."





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AGRICULTURAL SALESMAN, B.S., Age 37, 10 years experience in lab-oratory, technical service, field development and sales. Desires position in agricultural sales. Midwest loca-tion. Travel no problem. Complete resume on request. Excellent references. Address Box 322, c/o Agricultural Chemicals.

TECHNICAL SERVICE B.S. 1950, Age 37, Eleven years experience in the synthesis, formulation, production and field testing of agricultural chemicals. Presently technical director of large national pest control company. Address Box 323, c/o Agricultural Chemicals.

AGRONOMIST—M.S., additional graduate work in Plant Physiology (weed control). Age 34, married. Extensive experience includes: Formulation of pesticides, field and green-house testing of herbicides, other agricultural chemicals and fertilizers and turf management. Desires position in technical service or field development. Willing to relocate for challenging opportunity. Address Box 328, c/o Agricultural Chemicals.

Chemist-Chemical Engineer. Experienced in quality control as analytical chemist; directed plant operation of chemical processes. Can set up small or large laboratory, check and/or supervise chemical control in plant; - Or, do routine laboratory work. European education. Fluent in six languages. 36 years old. Box 326 Agricultural Chemicals.

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TALE ENDS

I N a report on world production of nitrogen, Chemical Week predicts that world production will reach a new high, estimated at about 15.7 million tons, in this fertilizer year (1961-62). Nitrogenous fertilizers, by far the largest outlet for nitrogen, are expected to account for 13.5 million tons. Speaking of the future, Chem Week says that there is no accurate tally of all the new agricultural nitrogen facilities being built in all parts of the world, but world capacity could conceivably total 27-30 million tons by 1965. Expected, then, is a period of large excess capacity, since consumption isn't likely to exceed a moderate growth

over the next five years, indicating a total of some 20 million tons by 1965.

AC

A 21-year-old Cuban aerial applicator fled from Cuba to Jamaica last month in his single-engined Piper PA-18A. He told immigration officials in Kingston that he and a friend had arranged to escape from Camaguey, but the friend failed to turn up on time, and so he escaped alone. Commercial applicators in the U.S. might add this to the list of operations that can be carried out by aircraft but not by ground equipment.

A Canadian paper company is markcting a wood pulp product that it claims helps to grass-seed large areas more cheaply and more efficiently than any method now in use. Canadian International Paper Co. says its new product, Turfiber, is a big advance in the establishment of turf, and one of its Quebec plants will start to produce it early next year. This green-colored wood pulp is mixed with grass seed, fertilizer, and a resin emulsion in a water slurry, and the mixture is sprayed on areas to be seeded. It forms a mat which reduces erosion and holds grass seed in place to assist germination and growth.

The garden supply market is expected to expand more than one-third between now and the mid-sixties, according to a recent Printer's Ink prediction that the present \$3.7 billion market may hit \$5 billion by 1968. The increase in leisure time and the addition of 1,200,-000 new homes annually are generally credited as the two basic reasons for this optimism.

Paul Stevens, a Southern California apple grower, has invented a device for attracting and beating to death the large numbers of insects that are active in his orchard at night. The device, which he calls a "Bug Buster," consists of a 15watt ultra violet light and two crosswire beaters that are simultaneously rotated by a small 1/100-h.p. electric This latest in a long line of mechanical insect killers-the first was two blocks of wood-is designed to kill insects in two ways. First, there is the bulb which will attract and kill some insects, and, second, the rotating beaters are supposed to destroy those insects immune to the charms of the electric light. AC

Now is the time to start thinking about the annual NAC meeting, which will be held this year at the Homstead in Hot Springs. Va. This will be the first time, as far as we can recall, that the NAC has met in Hot Springs. Those who have never before travelled to that region, therefore, should be forewarned that it is not the most convenient spot to get to and from. It is a long automobile drive from practically anywhere and, of course, railroad trains are not what they used to be. Nevertheless, it is a beautiful place and the trip, however accomplished, should prove to be well worth while.

Speaking of meetings and meeting places, — the Northeast Fertilizer Conference will be held October 12 and 13 at Schine Inn, Chicopee, Mass. Those who attend will see one of the most elaborate and luxurious motel type accommodations this reporter has visited. Be prepared for a very pleasant surprise. The lot of the traveling salesman is being brightened considerably by the opening of a number of these really high type tourist accommodations around the country, - a big improvement on the usual flea-bitten hotels which used to be the only thing available in most small towns.

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lts facilities include pellet mills for rodenticides, small packaging and filling equipment, granular, dust mixing and liquid formulating equipment. In addition, Hopkins acts as distributor of a compelte line of nationally advertised agricultural chemical items including herbicides, which they do not produce in their plant.

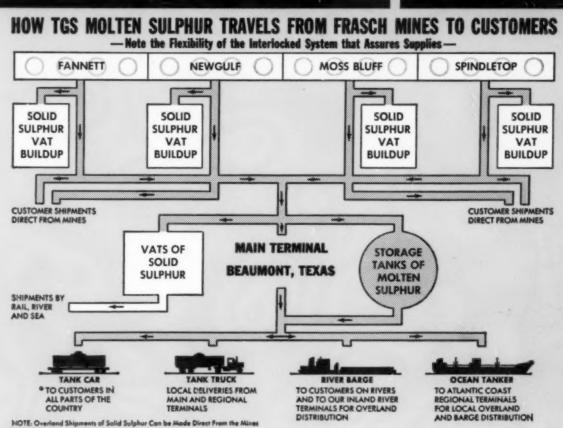
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describes importance



DROSOPHILA CONTROL

owing excerpts are taken from this bulletin.

National Canners Association 1133 - 2019 Street, Northwest Washington, D. C.

NOTICE

"The Food and Drug Administration has made extensive seizures of tomatoes and tomato products due to *Drosophila* egg and maggot contamination." ..."We strongly urge the cooperation of all canners of tomatoes and tomato products to initiate a complete program of *Drosophila* control."

Use of Pyrethrum Dust

"Extensive experiments and industry experience have revealed that pyrethrum dust containing 0.1% stabilized pyrethrins plus 1.0% piperonyl butoxide applied to tomato fruit will repel Drosophila flies and largely prevent egg deposition for 10 to 20 hours."

"Tomato canners are urged to discuss the above pyrethrum dust requirements with their supplier and obtain adequate certification that the dust purchased meets these requirements, namely:

(a)"That the dust contains a minimum of 0.1% stabilized pyrethrins plus 1.0% of piperonyl butoxide."

(c) "That the pyrethrum dust has been prepared in thoroughly clean equipment."



Copies of "Drosophila Control," from which these excerpts were taken, are available free from Fairfield Chemicals.

Pyrethrum dust bases, containing piperonyl butoxide and pyrethrins, are available to insecticide formulators and processors nationally through the nationwide field offices and sales representatives of Fairfield Chemicals. Food Machinery and Chemical Corporation.

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